Baca, John, NMENV

From: Kathryn Albrecht <lapaz@zianet.com>
Sent: Wednesday, September 26, 2018 1:41 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please deny the Copper Flat discharge permit, due to inevitable surface and groundwater contamination it would engender. Thank you!

Kathy Albrecht

--
Kathryn Albrecht
San Antonio, NM

"Do not be daunted by the enormity of the world's grief.
Act justly now. Love mercy now. Walk humbly now.
You are not obligated to complete the work,
but neither are you free to abandon it." — The Talmud

Baca, John, NMENV

From: Richard Altrock <altrockr@hotmail.com>
Sent: Monday, September 24, 2018 11:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit-1840

I cannot imagine that the department is even considering this horrible permit. This permit should be immediately refused! Any mention of contamination of ground water should cause it to be rejected. If it is accepted, I will call for an investigation into criminal influence.

Richard Altrock, Ph.D.

Baca, John, NMENV

From: Kim Audette <kcaudette@yahoo.com>
Sent: Monday, September 24, 2018 4:47 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir;
I am against permitting the discharge from the Copper Mine in Sierra County

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

5. Keeping in mind the abysmal response of the NM Environmentl Department to the discharge of the Colorado gold mine into the San Juan River, which was a lot smaller at 9 million gallons than this copper pit mine waste pit is, it is impossible for New Mexico to both permit the mine and protect its waters. New Mexico is too incompetent to contain spills in the public interest. Therefore, New Mexico cannot permit pit mines anywhere near any aquifers as a matter of acting in the public interest.

Kim Audette kcaudette@yahoo.com 618 Van Patten 575-740-1988 Truth or Consequences, NM 87901

Subject: On the Hearing before the Secretary of the Environment

In the Matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. *WB-18-06(P)

Background: My name is Ben Lewis. I am a 23year resident of Hillsboro, NM. I am also the current President of the Hillsboro Mutual Domestic Water Consumers Association (HMDWCA). The HMDWCA is organized under the Sanitary Projects Act and has provided potable water to its' members since the early 1960's. The Association is also a litigant in the matter before the NM Court of Appeals regarding the claimed water rights of the Copper Flat Mine (NMCC). I have been authorized by the Association Board of Directors to summarize and convey our comments on the proposed Discharge Permit. We are requesting that our comments be added to the record of the hearing.

Comments: The Association opposes the granting of the requested permit to discharge polluted water from mining operations in to the ground water adjacent to the mine.

- We believe that declaring the proposed pit-lake to be an evaporative sink in order to avoid additional requirements in the reclamation process is risky. While there may be an equilibrium of inflows and evaporation at the current depth of the pit-lake; at the proposed final depth of approximately 250 feet the direction of the flow of water may reverse and become an outflow. This process could also be affected by climatic conditions. We do not believe the water in the lake will meet applicable quality standards and therefore becomes an ongoing risk to the environment. The pit lake will be a permanent feature in the environment with the need for monitoring for the foreseeable future. A safer and more environmentally responsible option for reclamation of the pitlake would be to fill it with waste rock at the end of production. Also, the proposed mine does not have sufficient water rights to execute their preferred reclamation option of doing a "rapid fill" of the pit.
- The current proposed design of the Tailing Storage Facility (TSF) utilizing a single layer of HDPE over a gravel bed is of particular concern. Since HDPE is designated as semipermeable we know it leaks. The gradual construction over time creates a concern of degradation of the material from ultraviolet light, perforation by equipment during construction and the inability to verify the effectiveness of the many joints. The Association recommends that NMCC be required by the Department to construct the TSF using a a clay, not gravel bed underneath two layers of HDPE with a drainage system between the layers.
- We are concerned that the monitoring and interception wells are too far apart and too few in numbers. The proposed quarterly monitoring is too infrequent to be adequate for the intended purpose. Based on our experience over the past 50 or so years that the monitoring wells be tested on a monthly basis. We are also concerned that NMCC does not have sufficient water rights to operate the monitoring and interception wells.
- We have been led to believe that the operating life of the proposed mine is approximately 11 years. What is not clear is this to be construed as 11 contiguous years or many years of intermittent operation. This is important because it has serious implications for monitoring

pollution and maintenance of the mine infrastructure. At what point, this process does the proposed permit become null and void? At what point is reclamation required to commence?

- The proposed mine is based on a marginal ore base and to a great extent on optimistic projections of the price of copper. NMCC has no real roots in New Mexico and no longterm commitment to Sierra County. It is not part of a larger more robust mining operator with a track record of keeping commitments and successfully operating and reclaiming the sites where they operate. It is very much a boutique operation without the resources to withstand the variability of operating environment and economic conditions.
- Finally, we believe that it is premature to consider this application. NMCC does not have the necessary water rights to execute their mining plan. Premature granting of permits can infer greater value to the property and perhaps lead to another transfer of ownership as I have seen several times over the years. It is also the conversion of government permits to private property which is not allowed under the New Mexico constitution.

Baca, John, NMENV

From:	Chuck Barrett <amanecer.chuck@gmail.com>
Sent:	Monday, September 24, 2018 2:30 PM
To:	Baca, John, NMENV
Subject:	Comment For Record of Hearing on DP 1840
Attachments:	Discharge Permit 1840 Comment.docx

Dear Mr. Baca,

I hereby request that the attached comment document be added to the record of the hearing on DP 1840, Docket No. 8WB-18-06(P).

Thank You,
Charles P. Barrett

To: Butch Tongate, Cabinet Secretary
New Mexico Environment Department
Subject: In the Matter of Discharge Permit 1840 for Copper Flat Mine.

Docket No. 8WB-18-06(P)

Comments Of Charles P. Barrett
Homeowner: 10792 HWY 152, Hillsboro, NM

I own a home that is a scant three miles as the crow flies from the site of the New Mexico Copper Corporation's Copper Flat Mine. I oppose the granting of Discharge Permit 1840 due to the accumulation of serious unanswered questions and concerns that remain after examination of the Draft of the Discharge Permit.

I would like to put these into the record. I believe they are of sufficient scope and weight to require further investigation and substantiation before a valid Discharge Permit could be granted. They are as follows:

1. **The tailings pond liner might leak: interceptor system.**

The material for the liner has been known to leak in other instances of similar application over operational and post-operational time (which is seriously underestimated due to NMCC's undercapitalization and inaccurate projections and surety—see 5 below). If it does there is nothing underneath to catch the leakage. Does that mean the interceptor system has to be in place before the leakage is detected? Has NMED determined that NMCC has the water rights to pump water at that location at the base of the dam?

2. **The tailings pond liner might leak: sufficient groundwater.**

Has NMED seen the design of the interceptor system in sufficient detail to determine whether there is sufficient groundwater at that location to make the system work to capture all contamination?

3. **HDPE liner material degrades**

Is it true in the scientific literature that HDPE is considered not wholly impermeable to water but always leaks at least a little? For example black HDPE that I have used in my garden cracks and degrades in the sun and is clearly not impermeable. Has NMED evaluated this aspect of the liner's potential for leakage over decades?

4. **The Plan for the Tailing Storage Facility (TSF) is Contradictory and Inadequate**

The Draft states that the TSF will be reclaimed after operation by 6 years of "active evaporation" and then 21 years of "passive evaporation," and then covered up and seeded. During the first period, the "under-drain" (which is not an under drain) system is draining the TSF to a pond on the downstream side of the dam (i.e., near the highway) from where the water is pumped back up to the TSF. This is just a continuation of what has been happening during operation, that is, water seeps through the accumulated sediments of the tailings, goes into a layer of sand which has perforated pipes in it to collect and carry the water out under the dam to the drainage pond. It's analogous to a

big "French drain." When the drainage stops after 5 or 6 years, NMCC's plan is to turn off the electricity and sell the pumps and go into the "passive" phase, which only means that the muck in the TSF is left to dry on its own, for 20 years or so before they cover it with dirt and seed it. During the passive phase, the drainage pond will be replaced by a larger evaporation pond (which seems to suggest that water will still be seeping out the bottom of the tailings pond). This plan is unacceptable as it allows seepage in the "passive" phase that could contaminate groundwater.

5. **The TSF Reclamation Raises Questions Due To NMCC's Inadequate Operational Finances**

In the studies the NMCC presented to the NMED, they continue the assumption that mine operation is 11 years. Following this logically they then say about the TSF reclamation that it will be completed in "year 39." This is contradicted by both the history of the mine and the history of copper prices that would affect the mine which would strongly suggest that they are probably not going to be able to mine for 11 years continuously. NMCC projects that it needs $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 11 straight years of over $3.00 /lb. prices. So the chances are slight that we will see the TSF covered up in 39 years. If the mine takes 20 years to get the copper out, it will be 47 years that those of us who live or own property nearby, as is the case with this commentator, live with the threat of the TSF hanging over the whole Rio Grande valley. In fact, if some blip happens in Themac/NMCC's finances and the company goes bankrupt or if the company just shuts down after taking out the copper, are we left with a permanent contamination issue? After all, Themac/NMCC owns no other property: are they going to stay intact just to reclaim the tailings pond? So, the arrangements for a surety bond are crucial, and that is not yet in place but still being negotiated. NMED should not grant a Discharge Permit until the public gets a look at how we are to be protected.

6. **Unanswered technical questions about closure.**

How often will the monitoring wells that detect leakage from the TSF be checked after closure? This question arises from the fact that the duration of the reclamation of the TSF is longer than the operating life of the mine. If there is a leakage, an interceptor system has to be activated. Who will do that? Who will pay for that since the cost of these wells and pumps will not be part of the normal reclamation surety. The contamination of groundwater will trigger a fine of $10,000 per day, but that will be insufficient to pay for continuing operation of an interceptor system plus the cost of cleaning up the contamination. What if there is a major break in the HDPE liner or of the dam during active evaporation? What if during the passive phase, the evaporation pond overflows (note that it is near the highway)? That surface contamination will be undetected by the monitoring wells, and even if detected, the protective ring of interceptor wells will be inoperative since the electricity will have been turned off.

7. **The Pitlake Reclamation Plan Contradicts Beneficial Use Standard**

The question arises as to whether NMCC's fast-fill method of reclaiming the pitlake violates the New Mexico Constitution, wherein under (XVI, 3) the right to use water is limited to beneficial use. To use approximately 2,800 af of water to avoid having to

reclaim the steep pit walls or to avoid regulatory standards of pollution is not beneficial use of water. To create a large, chemically polluted body of water is not a beneficial use of water. To waste this much water – when the 2018 Draft New Mexico State Water Plan cites insufficiency of water supply as the major water problem the state faces and the 2016 Regional Water Plan for Socorro and Sierra Counties documents this insufficiency in coming years for Sierra County – will irrevocably harm the people's welfare and violate the public's interest, the water being permanently lost through evaporation. If the water were used to dilute polluted water so that it could be used beneficially, the filling of the pitlake might be allowed, but here the dilution is temporary, and eventually the pitlake will be polluted, as is the present pitlake.

How can this wasteful use of water be seen as part of the beneficial use of mining and have any lawful merit. First, the use is post-closure, after productive mining has ceased. Second, and more important, the usage is peripheral to actual productive use, a distinction defined in numerous court cases. In State ex rel. Martinez v. McDermett, 120 N.M. 327, § 13, the New Mexico Court of Appeals distinguishes productive agricultural use – meaning to grow crops - from peripheral uses such as using water to soften land to prepare it for plowing. The denial of peripheral uses of water as beneficial use has a solid base recognizable in New Mexico. See United States v. Alpine Land and Reservoir Co., 697 F. 2d 851, 854 (9th Circ. 1983) ("We do not deny or overlook the differences in water law among various western states. However on the point of what is beneficial use the law is 'general and without significant dissent.'") (citing 1 Waters and Water Rights § 19.2 (R. Clark ed., 1967).

Before proceeding to permit, the NMED should seek an opinion from the legal branch of the OSE as to the legality of wasting water in New Mexico.

Baca, John, NMENV

From: Bo Bergstrom <bo.cinesthetic.30.yx@gmail.com>
Sent: Monday, September 24, 2018 1:10 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr Baca:

I oppose this permit for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank for you taking my citizen's opinion.

--Sincerely, Bo Bergstrom, 30 Village Rd., Silver City NM 88061

Baca, John, NMENV

From: Walter Bishop <walterjb1@yahoo.com>
Sent: Monday, September 24, 2018 11:29 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Copper Flat Mine knew from the beginning of mining in New Mexico that there would be liquid wastes that they could not process to make it safe to discharge. Now, they want to make their problem to become the citizens of New Mexico's problem.

I say "No."

Walter Bishop
PO Box 841
Elephant Butte, NM 87935
310 686 8336

Baca, John, NMENV

From: Ramona Blaber <monablaber@gmail.com>
Sent: Monday, September 24, 2018 10:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit 1840

Hello Mr. Baca — Is this the correct email address to send written comments to on the Copper Flat Mine permit, and what is the deadline?

Thanks,
Mona Blaber
Sierra Club Rio Grande Chapter communications director
505-660-5905

Public hearing comments on Copper Flats Mine

September 24, 2018

Good morning. I am Dr. Kathleen Blair. I am a resident of Hillsboro and have owned property there for 10 years. My Pd.D. is in Zoology with a specialization in Ecology, particularly the impacts of natural and human caused changes in natural processes to ecosystems. I have taught a wide variety of university courses as an assistant professor in ecology, environmental biology, botany, and wildlife biology and management at Central Missouri State and West Texas A&M universities and as adjunct at Texas A&M. For the last 20 years I have been the ecologist for the U.S. Fish and Wildlife Service at the Bill Williams River NWR which is located downstream of the Bagdad Copper Mine. Consequently, I have professional expertise as well as a personal interest in the results of this discharge permit hearing for the Copper Flat Mine.

Copper and other minerals it is found in association with as well as many by-products of processing, have been found highly toxic in multiple studies. As a result, I have 4 major concerns I do not believe have been adequately addressed relative to this discharge permit:

A) Federally protected migratory waterfowl and New Mexico wildlife species of concern will be attracted to this extremely large, increasingly toxically contaminated water of the settling/evaporation ponds and pit lake as they have been to many similar features in mines in Arizona and throughout the desert west. This has resulted in major deaths of wildlife and high costs in fines and remediation for the mines. I see no provision for preventing this from occurring.

B) Due to the toxicity of copper, as well as ancillary contaminants, any discharge from the catchment basin into surface or groundwater regardless if accidental human error or a natural event in excess of your current parameter estimates could be severely damaging for people, wildlife, and plants in the watershed downstream of the mine. Such impacts would include the rural residents of Animas and Percha watershed, the town of Caballo, Caballo Reservoir, Percha Dam State Park and potentially into the lower Rio Grande mainstem. This would likely last for decades, or perhaps in perpetuity, as it has elsewhere. Naturally occurring contaminants released or exposed by mining activities and not considered in these documents may well prove to be the most damaging of all even as mercury from the Bagdad has contaminated Alamo Lake, one of the top bass fishing lakes in Arizona, until the fish are frequently found to exceed human safe consumption levels. Effects on other wildlife has not been as well tracked.

C) Copper is necessary in small quantities for healthy plant development but can be highly toxic in higher concentrations especially in water as noted by recent concerns for copper as well as lead in public water supplies. It is the primary algaecide, fungicide, and herbicide for aquatic application. Wind driven dust from the massive tailing piles and the dry sediments from the evaporation ponds carrying copper, as well as other companion contaminants, may easily affect the people, wildlife, and plants downwind. Once rain carries the contaminated dust to the ground it enters the soil where plants and critical mycorrhizal fungi can uptake it and be damaged and killed. Without those soil fungi communities restoration will not have good success. It not an accident that the land and hillsides around such towns as Globe, Bisbee, Santa Clara, and Bagdad look like they have been sterilized. They have been. And ask Ottawa county

Oklahoma about making the deadly mistake of using mine tailings on roads and infrastructure projects.

D) Climate change has not been adequately addressed in my opinion.
   1) Projections of increasing temperatures in New Mexico for the foreseeable future will result in higher evaporation rates than projected. This will increase the contamination concentration in the settling basins and pit lake especially when combined with the recycle/reuse process. Higher evaporation rates will also speed the exposure of toxic sediments as dust which becomes airborne for distribution downwind to contaminate air quality in the air and the watershed after rain.
   2) Flash flood potential will be increasing over the time this mine is projected to function. Although overall the weather pattern is reliably projected to increase drought overall, rain events resulting in increased severity of flash flooding is projected to increase and has begun to be documented in many locations in the western US. This will be further fueled by increasing forest fire frequency and severity altering the watersheds to further increase flooding. Such ecosystem processes require many decades to regain the ability to temper heavy rain fall. Hurricanes in the Gulf of Mexico are projected to increase in intensity and some of those impact New Mexico such as the massive flooding from Hurricane Dolly in Ruidoso 2008 proved as well as hurricanes crossing Mexico from the Pacific bringing high rainfall. Should any feature holding or directing contaminated water including the permanently and increasingly contaminated pit lake be overtopped, eroded, or fail at any time during or after mining activities, the downstream flow of heavily contaminated and sediment would damage property and water resources potentially as far are Caballo Reservoir and the lower Rio Grande, perhaps permanently. There are certainly many, many examples of both mine retention ponds being over topped, failing due to flooding, and accidental release due to human error. I see no provision for an emergency retaining structures to protect the downstream watershed from any of these events during the life of the tailings storage ponds until it is fully reclaimed or afterwards should closure sealing fail, or for the pit lake at all. The pit lake will be a permanent pollution machine.
   3) Species and genetics of plant community chosen for restoration. Has anyone done a botanically valid flora of the area to enhance success? Worked with universities? New Mexico Plant Material lab? In light of climate changing the vegetation?

Kathleen Blair, Ph.D.

PO Box 494, Hillsboro, NM 88042

575-895-5159

NEW MEXICO MINING ASSOCIATION
COMMENTS--PUBLIC HEARING ON PROPOSED DISCHARGE PERMIT DP-1840
FOR NEW MEXICO COPPER COMPANY, COPPER FLAT PROJECT
SEPTEMBER 25, 2018

My name is Michael Bowen and I am the Executive Director of the New Mexico Mining Association ("Association"), whose address is 1470 St. Francis Drive, Santa Fe, New Mexico 87505. The New Mexico Mining Association currently has 18 operator members who explore, mine, produce and refine sand and gravel and other aggregates, coal, copper, humate, industrial minerals, molybdenum, potash, precious metals and uranium in New Mexico. In addition, the Association has over 70 associate members who provide consulting, construction, engineering, drilling, laboratory, legal, reclamation, and other services, and equipment, fuel, power, chemicals and other supplies to the New Mexico mining industry. The Association serves as a spokesman for the industry and is active in representing its members and keeping them informed concerning legislation and regulatory developments. It also serves its members on a wide variety of subjects such as taxation, environmental quality, public lands, health and safety, and education primarily through the expertise of its members and member companies.

According to the latest Annual Report published by the Energy, Minerals and Natural Resources Department, in 2016 the mining industry in New Mexico

reported production values of more than $1.7 billion. New Mexico ranks first in the U.S. in potash production, second in copper production, and 11th in coal production. New Mexico was once a leader in the production of uranium and still has large uranium resources that may be mined in the future, market conditions permitting.

Total direct and contract employment by the mining industry in 2016 was just under 5000, with total payrolls over $330 million. Mining jobs are typically some of the highest paying and sought-after jobs, particularly in rural areas. Mining creates many additional jobs in the community, as illustrated by the goods and services provided by our associate members, and other local goods and services provided to our mine employees. Since most mining operations are located in rural areas, these jobs are critical to the local economies where the mines operate.

Minerals are vital to everyday life. All of our electrical energy is supported by mineral production, including electric power generated from coal, uranium and oil and gas, as well as renewable power generation that requires steel and copper and other metals for wind towers and motors; steel, copper, silver and other metals for photovoltaic cells and solar installations; and copper, steel and other metals for transmission lines. Potash and other fertilizers are essential to produce our food, and our roads and buildings for homes and businesses cannot be constructed

without aggregates. If these essential minerals are not being produced in New Mexico, they must be produced somewhere else. New Mexico might as well enjoy the economic benefits of mineral production as well as the everyday benefits that consume minerals. As the Legislature said in the Mining Act, the exploration, mining and extraction of minerals is vital to the welfare of New Mexico.

I believe this is the first public hearing held on a proposed discharge permit under the Copper Rule. The Copper Rule was adopted by the Water Quality Control Commission in December 2013 pursuant to the New Mexico Water Quality Act. Since then, the Copper Rule has been scrutinized and upheld on appeals to the New Mexico Court of Appeals and the Supreme Court, in each case by unanimous decision. The Copper Rule implements legislation passed in 2009, so the Copper Rule has been backed by all three branches of New Mexico's government. The Copper Rule specifies detailed requirements for the design, construction, operation, monitoring and closure of copper mines to protect ground water quality. These requirements are based upon experienced gained under discharge permits issued over nearly 40 years.

I am impressed by New Mexico Copper Company's plans for the Copper Flat project. New Mexico Copper has worked tirelessly to satisfy the requirements of multiple federal and state agencies, including BLM, the U.S. Fish and Wildlife Service, the Environment Department, and the Mining and Minerals Division.

While this hearing is limited to consideration of the requirements for a ground water discharge permit, the mine plans reflect the need to comply with a myriad of environmental protection laws. These plans have taken years to come to fruition at a tremendous cost, representing New Mexico Copper's investment in the development of New Mexico's mineral resources. I am happy to see that the Environment Department has issued a draft permit based upon the Department staff's conclusion that New Mexico Copper's mine plans appear to meet or exceed all of the requirements of the Copper Rule and the Commission's regulations. With the permit conditions proposed by the Department, the Copper Flat project will be operated in a manner that protects ground water quality.

As I previously discussed, development of New Mexico's mineral resources provides many local and statewide economic benefits and employs many local residents. Issuance of a discharge permit for the project will be a great step forward to realizing the important benefits this project will provide in terms of employment, revenue for local and New Mexico businesses, and substantial contributions to state and local tax revenues to support our schools, roads, and other government services.

Many years have been spent and countless dollars spent for experienced engineers, scientists, and other experts to develop the plans for the Copper Flat project. These plans must comply with the myriad of federal and state laws and

regulations imposed on mining projects to ensure protection of public health and safety and the environment. Nevertheless, project opponents seek to distract from all of these protections by creating imagined scenarios intended to scare the public and exaggerate the risks. Many of these perceived risks have nothing to do with the Copper Rule, ground water protection, and the matters at issue in this hearing. I urge the Hearing Officer and the Department to focus on the requirements set out by the Water Quality Control Commission. Other matters, such as dam safety requirements and water supply issues should be left to consideration by the agencies assigned by the Legislature to consider those issues.

Approving DP-1840 will be good for the state and local communities, and will send the right message to mining companies that are willing to invest significant resources in promising projects such as the Copper Flat Mine. For these reasons, on behalf of the New Mexico Mining Association, I urge you to approve Discharge Permit DP-1840 after considering all relevant testimony and comment.

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:38 PM
To: Baca, John, NMENV
Subject: FW: Public Commentary Flat Copper Mine

From: Gordon Bryson <gordonbryson@yahoo.com>
Sent: Tuesday, September 18, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Public Commentary Flat Copper Mine

Dear Mr. Reid,

I am not a citizen of the state of New Mexico but have lived all my life in East Texas. My opportunities to visit New Mexico have been limited but the several times I've been in the northeastern part of your state have been most enjoyable and always create a desire to return again soon.

My reason for writing this is to register my concern for the proposed Flat Copper Mine and its probable impact on the beautiful streams and natural habitat of a vast part of New Mexico. Not only that immediate area, but a wide watershed area that ultimately impacts the State of Texas via the Rio Grande River. The Animas River incident that happened in the past few years should make all aware of the potential ecological dangers posed by commercial enterprises, especially when foreign corporations who have little concern for our country are permitted to operate here.

As an avid fly fisherman, and father and grandfather to two more generations of active fly fishers. I am deeply concerned about the effects of this project on the fine trout fishing found in the pristine streams of New Mexico.
While not a hunter, I have many friends in Texas who hunt there and the impact on the wildlife is another major issue. People from all parts of Texas visit your state for fishing, camping, hunting, hiking, shopping and other pastimes that generate substantial financial gains for your business people and the state of New Mexico.

Please do not permit this project to proceed in its present format, and only consider acceptance of redefined plans if they are acceptable to all affected environmental entities.

Gordon Bryson
2205 Thornwood
Tyler, TX 75703
903.520.2766
gordonbryson@yahoo.com

Lone Star Fly Fishers on Facebook
Lone Star Fly Fishers (LSFF Website)

Baca, John, NMENV

From: Robbin Brodsky <robbinbrodsky@gmail.com>
Sent: Tuesday, September 18, 2018 3:06 PM
To: Baca, John, NMENV
Subject: Comments on the hearing before the Secretary of Environment

Concerning discharge permit #1840 for Copper Flat Mine, Docket #8WB-18-06 (P)
I oppose granting this permit. My name is Joyce Robbin Brodsky. I am a resident of Hillsboro, New Mexico and a member of the National Audubon Society, New Mexico Wild, and the National Wildlife Federation. Themac's plans to mine copper and other ores using a pit mine and construct a tailings containment pond that will cover approximately 1 square mile will appear to our migrating bird populations as a welcoming stopover. When in fact, the waters would most likely kill these birds with the pollutants as in what happened at a copper mine outside of Butte, Montana when a flock of migrating geese landed in pit waters and died. Necropsies showed their insides were lined with burns and festering sores from exposure to high concentrations of copper, cadmium, and arsenic. Then there is the 4-legged wildlife such as deer, elk, bear, mountain lion, javelina that will see the water in this high desert environment very inviting. It does not make sense that an individual in Australia will profit from the loss of our wildlife. Please keep our state's vulnerable wildlife in mind when considering your decision.

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

The draft proposal for the Copper Flat Mine should be denied for a number of reasons. There is inadequate characterization of the bedrock. Mine pollutants would probably not be adequately contained to prevent groundwater pollution.

Water quality standards are not relevantly addressed, and the proposed groundwater monitoring wells are inadequate.

The discharge permit, authorizing up to 25.3 million gallons per day of potentially polluted wastewater is wholly unacceptable. The impact on streams, humans, wildlife and endangered species could be seriously affected by contamination; even the potential risk is unacceptable.

The amount of water needed for the mines use is staggering to even consider in our arid climate. Pumping our precious water resources would adversely drain and damage our ecosystem, local streams, and the Rio Grande. Not acceptable.

NMCC is not a trustworthy steward. They have been cited for numerous violations.

There is no guarantee that the mine would meet the Water Quality Act, and in this time of loosening environmental regulations, I do not trust that any serious enforcement would occur if NMCC failed to comply.

I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:42 PM
To: Baca, John, NMENV
Subject: FW: Copper Flat Mine
Attachments: copper flat mine.docx

From: Deborah Brandt <debjbrandt@me.com>
Sent: Thursday, September 13, 2018 2:10 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Copper Flat Mine

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

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Thank you,

Deborah Brandt

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:36 PM
To: Baca, John, NMENV
Subject: FW: Docket No. 8WB-18-06(P)

Another one....

From: Rick Burns <animasrick@gilanet.com>
Sent: Monday, September 24, 2018 11:08 AM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Docket No. 8WB-18-06(P)

Hearing Clerk, John Baca

Docket No. 8WB-18-06(P)

My name is Rick Burns, I live in Animas Creek canyon north of the copper flat well field, and would like this to be included into the public comments re: this discharge permit.

Here are a list of things i find lacking in the current wording of the permit application:

1. Incomplete Characterization – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.

2. State Water Quality Standards Must Apply – NMCC is claiming that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

3. Groundwater Monitoring Is Inadequate – Even though NMED has added 2 additional groundwater monitoring wells, the total number of wells and their location is still inadequate. The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and the tailings storage facility.

4. Hazard to Public Health and Undue Risk to Property and Public Safety

o The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.

o The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

5. Streams Important for Wildlife, Including Endangered Species – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

6. Financial Assurance – The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation. This was not satisfactorily done during the permitting for Quintana.

Reopening the Copper Flat mine is a terrible idea on several counts.

I spoke with Brad Reid at the water quality bureau in Albuquerque, who told me that this mine will require a water tailing storage facility encompassing several hundred acres. It will be an open air, plastic lined pit of several hundred acres! Any runoff will flow down the face of a dam into some sort of collection pond. I don't know the size of that. What kind of vapors will that give off? Toxic elements that will drift into the air around the neighbors in the area? The absolute destruction of several hundred acres of beautiful land and wildlife habitat should be enough to block this project, but to dump noxious tailings into such a huge, plastic lined pit, endangers the ground water, a much more precious resource than the copper they hope to extract. If the water tailing storage pit develops a leak, how could it possibly be repaired or even detected before ground water contamination occurs?

I hear there is a very loud smashing and grinding involved in processing the ore on site. Besides the noise, there is an airborne dust created, which, I imagine, is not pleasant to breathe, either.

So, besides the air pollution, water pollution, and

Noise pollution, this project plans to operate right next door to the Ladder Ranch, a well known environmental preservation project which, as of Friday the 21st, had a total of 191 visitors this year, with a full schedule of tours for October. The mine is the exact opposite of this immediate neighbor's business, and is absolutely the most ruinous of neighborhood projects imaginable.

The couple hundred local folks proposed to be employed by the mine does not compete with the money that hundreds of tourists a year consistently spend on local hotels and restaurants so they can observe and appreciate the amazing and beautiful natural landscape and wildlife that New Mexico is known for, and that our children will inherit for generations to come.

The short term thinking of the bottom line of this mine will dry up our local wells with an outrageous number of gallons of water usage. Where will we be then?

Ecotourism will endure forever if we protect this sustainable industry.

Thank you

RHONDA BRITTAN

TRUTH or CONSEQUENCES, NM

the

NEW MEXICO
BUSINESS COALITION

Comments for Copper Flat Mine NMED Groundwater Discharge Permit Hearing

My name is Ray Irwin. I am a registered professional geologist currently serving as Exploration Manager for Stella Natural Resources, and I'm here today on behalf of the New Mexico Business Coalition.

As you may or may not be aware, the New Mexico Business Coalition is a grass-roots, statewide, pro-business association. We support job creation and reasonable regulation, which includes granting of the necessary discharge permit for the Copper Flat Mine.

As V.P. of Exploration for THEMAC Resources from January 2012 to December 2013, I planned and supervised all geology related activities at the Copper Flat mine site. As a result, I have specific knowledge and a deep understanding of the project's geology and potential environmental impacts due to planned mining. During and since my time working on the project, THEMAC Resources has expended a very significant amount of time and money to develop a mine plan that will safely exploit the copper deposit at Copper Flat in an environmentally sound manner that complies with all State and Federal regulations, and minimizes long term environmental impact.

You will probably be hearing opposition to this mine that is largely, if not completely emotionally based. My comments will stick to what I know to be a fact. The Copper Flat Mine is going to be a closed-loop facility, which not only minimizes water consumption but also prevents water from leaving the premises except via evaporation. Additionally. a lined tailings storage facility equipped with an impermeable synthetic pond liner will be constructed to prevent water used in the milling process from seeping into ground water while simultaneously the mill tailings are secured by an engineered structure to prevent discharge into nearby drainages.

Since the planned operations of the Copper Flat Mine will be a zero-discharge facility, it will not require a National Pollutant Discharge Elimination System permit from the EPA, which governs surface water discharges. Likewise, under current mine plans and designs, Copper Flat will not need a 404 permit from the U.S. Army Corps of Engineers.

With these plans in place and federal agencies satisfied, NMBC is confident that a Groundwater Discharge Permit approved by the New Mexico Environmental Department would be a prudent step in moving the development of the Copper Flat Mine forward.

From an economic perspective and during the 18 to 24-month construction period, the Copper Flat Mine will generate approximately 1,150 direct, indirect, and induced jobs in the region and the State.

Once in operation, the Copper Flat Mine will generate approximately 275 to 300 long-term, high paying jobs at the Sierra County location; and similar to the construction phase, many more indirect project related service and support jobs in the region and State.

The estimated annual mine payroll is approximately $16 million before payroll taxes and benefits. These anticipated new high paying jobs with good benefits is exactly what Sierra County and New Mexico needs.

The NMBC and I, therefore, ask that your decision on this important issue not be swayed by negative misinformation and encourage you to approve the Groundwater Discharge Permit.

Thank you

FREEPORT-McMoRan

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

Baca, John, NMENV

From: Susie Bussmann <suceppib@gmail.com>
Sent: Monday, September 24, 2018 10:14 AM
To: Baca, John, NMENV
Subject: Docket No. SWB-18-06(P)

Follow Up Flag: Follow up
Flag Status: Flagged

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Dr. Susan Bussmann. My family farm is just 3000 feet north of the of Copper Flat Mine production well field, and I urge you to deny the discharge permit for this alleged mining operation. There is just no way these foreigners will operate this mine for 11 straight years and fulfill the cleanup requirements, bond or no bond. The 10 largest copper mines in the western hemisphere produce more in 11 days than this operation would in 11 years, and when they do go under the fine people of New Mexico will be left holding the bag for the cleanup, as they already have. Just say no, thank you.

Dr. Susan Bussmann

HC31 Box 89

Caballo NM 87931

Baca, John, NMENV

From: Bill Bussmann <bussmann@zianet.com>
Sent: Friday, September 28, 2018 4:06 PM
To: Baca, John, NMENV
Subject: [EXT] Copper Flat Mine Discharge Permit 1840 comment

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Bill Bussmann. I live on Animas Creek near the proposed mine and I would like to share my concerns with you.

At this time it makes sense to delay a decision on the discharge permit until such a time as Themac can show they have legitimate water rights for the entire operation. Ongoing litigation over alleged water rights in the lower Rio Grande basin demonstrates the inappropriateness of the NMED issuing a permit for discharge from an operation which has only enough water rights to run 83 days a year, but all the details of the discharge and possible contamination of ground water are calculated using a 12 month a year/11 year life of mine scenario. Sort of like buying the variety dozen pack of Trojans when you don't even know any girls! They should resume the permitting process when they have obtained sufficient legal water rights.

Chief operating officer Jeff Smith mentioned that Tulla was the Mahoney family trust that was going to fully finance the installation and initial operation of the mine, taking all the risk, and taking up the slack when copper prices were down, to ensure a full, non-stop, 11 year operation. Two years ago they agreed that they would discuss the terms on which Chinese mining company Yunnan Haliliya might be able to increase their interest in NMCC to 51%, after an initial 6% investment. The deal fell through, but demonstrates they are really trying to get all the permitting paperwork in order so they can pass off this used car of a mine or, at the very least, sell most of the risk.

Since NMCC has a proven track record of NO reclamations and NO financial assurances in their past mining history, I urge you to proceed with utmost care to ensure that the people of New Mexico are not stuck with the cleanup bill for this toxic rockpile.

Hydrogeologically yours

bill bussmann

hc31 box89

Caballo NM 87931

Baca, John, NMENV

From: A.T. Cole <atandcinda@gmail.com>
Sent: Tuesday, September 25, 2018 2:50 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello:

This request ignores the reality of our times. There is a shortage of potable water and to allow this magnitude of dumping is unconscionable. Please say 'No."

A.T. & Lucinda Cole
Grant County Residents

"We are faced with the most colossal set of events in human history: *the catastrophic convergence* of poverty, violence and climate change." Christian Parenti

Baca, John, NMENV

From: Susan A Christie <susan.christie1@icloud.com>
Sent: Monday, September 24, 2018 2:22 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

From Susan Christie & Bill Brown
Residents at 905 N Foch, T or C

We are registering our opposition to the Copper Flat Mine's Discharge Permit 1840.
We are totally against going thru this fight again but we are again registering out
total opposition to this permit.

Claims that this will produce continuous jobs are false. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

They will not clean up after themselves. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater. The threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

They require a damaging amount of water. In fact we believe that they are only after the water and do not care about the copper. It is likely that it will destroy environments up into Hillsboro and communities by lowering the water table.

This is our brief but important list of objections to this permit.
Thank you.

Baca, John, NMENV

From: Bruce Cosper <brcbruce@outlook.com>
Sent: Friday, September 28, 2018 5:34 AM
To: Baca, John, NMENV
Subject: [EXT] Cooper Flat discharge permit

To Whom it may concern:

My name is Bruce Cosper and I am a resident of Hillsboro N.M. My family has lived here for four generations. My son and business partner Asa Cosper, who also lives here own and operate a construction company, Black Range Const. We are in support of the Cooper Flat Mine. I was living here when Cooper Flat opened and worked out at the mine for Quintana. At the time of the mine operating there was positive influence on the town of Hillsboro and TorC. Young families were able to live here and have decent work that payed well. The school bus that served Hillsboro carried a number of kids instead of the one or two that ride it now. Even when the mine was working at full capacity you would never know it on the streets of Hillsboro. I never heard of anybody's well being effected by the mine, I know for a fact that our well never fell below it's original static level. My uncle, Harvey Chatfield whose family homesteaded there Ranch in Animas creek never had any well problems that resulted from the wells that the mine pumped out of, if they did effect him, and his ranch you would have heard about it from him.
I trust that the EPA and other agency's of the state will do there job, as well as Cooper Flat Mine to keep our environment safe and returned to a more natural state whenever the mine closes. What I am worried about is that some of the people that have been apposing the mines opening. Some have only lived here a short time, and don't know the history of the area some only live here part time. Many of these folk's will sell there homes and move on to somewhere else after a few years of being here weather the mine opens or not. They are retired and really don't care what the economics of the county are in and what this mine can do for young families, for our schools and small business that currently struggle making ends meet. I believe that the positive economics will carry on for years to come and will out way any of the negative that might occur.
I want to Thank you for your consideration and time that you are taking in approving the Cooper Flat mine discharge permit and look forward towards your continuing efforts in making this operation a success.

Thanks Again,
Bruce Cosper
Black Range Const.
Hillsboro N.M.

Sent from Mail for Windows 10

My name is Veronique De Jaegher. I live locally in Kingston. I am opposed to the granting of the Discharge Permit (Docket No. 8WB-18-06(P)) for many reasons...

I am concerned about the interceptor system around the dam of the tailings pond, a ring of wells that pumps groundwater back into the pond if contamination is detected in the monitoring wells.

Are there enough monitoring wells to detect all the contamination?

If the water if flowing fast, can't a stream of pollution go between the monitoring wells undetected at the wells?

The same questions can be asked about the interceptor wells.

How do they know if all the contamination will be captured.

How close do they have to be to each other?

How deep do the wells have to be?

Have they tested or even designed the system? If not, who will design and build the system if NMCC is gone, i.e., during reclamation.

Does the money NMCC leave with the state for reclamation include funds for an interceptor system that might be needed if after closure the monitoring detects contamination?

NMCC SAYS IT WILL CREATE 270 JOBS OVER 11 YEARS...I know that this issue is not germane to the granting of the Discharge Permit, but the issue is repeatedly brought up by the mine's supporters,

- First, in the contract that binds NMCC with the Jicarilla Apaches it is specifically stated that "NMCC will give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities" So those jobs won't be local employment...

SEE ARTICLE 21

POLICY STATEMENT ON INDIAN PREFERENCE

21.0 As an employer, the Nation seeks to employ individuals who possess the skills, abilities, and background to meet the employment needs of the tribe. As a sovereign Indian tribe and a unique cultural group, the Nation promotes preference for qualified Indian individuals in employment. Accordingly, the Nation has established Title 23 in the Jicarilla Apache Nation Code for hiring employees to provide services that meet the needs of the Nation's people. NM Copper hereby supports and endorses the policy of the Nation and shall reasonably consult with the Nation to give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities. It is the intent of NM Copper to build a core group of skilled labor candidates through job placement and training assistance to eligible enrolled members of the Nation....

- Second, that employment would be temporary because of the "stop and go" mining due to fluctuation of copper price and not enough water.

What happens to all those jobs when the mine temporarily closes??

Thank you for your attention.

Véronique De Jaegher
HC 69 Box 101
Hillsboro, NM 88042

Good evening, I am Nichole Trushell of Kingston. I am a biologist and have lived in the southwest all of my life.

As a resident of Kingston, why I am concerned -- this project is not located in my *backyard.* I care because if the **Discharge Permit** is granted, wheels will be in motion for stunning quantities of un-reclaimable water to be used, for toxic chemicals to be released from the soils, and for life-supporting waterways to be threatened. Groundwater would likely be impacted, as would Animas Creek, a unique ribbon of LIFE running through our dry landscape. The lives and farms of local people, many of whom have lived in along the Animas for decades, could be irreparably damaged. And, of course, the Animas flows into the Rio Grande.

Deciding in favor of this permit is wrong, key reasons for me:

1. The toxicity of the massive amount of waste material and its permanence. Serious questions: How can long term management of the liner be assured? Who truly understands the effects of the underlying geology? Who will monitor this area and the potential for devastating contamination for generations to come? Who monitors it now? Where are those reports? Who will respond when system failures occur? Who will pay for long term care?

2. The monumental use and toxification of precious water. The amounts of water proposed for operational needs are preposterous in a dry environment. I noted that a figure of 2.3 BILLION gallons of water was requested by NMCC for yearly operations. Unlike municipal water, this water will never directly recharge our groundwater – it cannot. Let's quickly calculate: If an average personal water use is say 125 gallons of water a day, this amount of water alone would supply a city of 50,000 people for a year!

3. The economic benefit is very short term and questionable at best. And a FOREIGN company is the greatest beneficiary, not New Mexicans.

In closing:
Allowing this project is a decision with effects long into the future – negative effects. If any of you have precious family, or care about water, you must not grant this permit. This excessive waste and toxic legacy will be yours. The TRUE COST to our water and to our environment is too great. NO PERMIT.

Thank you.

Nichole Trushell M.S.
123 Kingston North Street
Hillsboro, NM 88042

Docket No. 8WB-18-06(P)
Comments on the Draft Discharge Permit 1840 for the Copper Flat Mine before the Secretary of the Environment.

I am opposed to the granting of this discharge permit as it has been proposed. It is the duty of the Environmental Department to protect the health and safety of the people and the environment from the contamination by toxic materials in the ground water. Because there is current contamination that has been known for 35 years, greater precautions should be taked. The 600 acre, 200ft deep Tailing Storage Facility is inadequately protected and monitored as planned. The proposed underdrain system does not satisfy the Copper Rule which specifies a lining seepage collection system [NMAC 20.6.7.22A(4)(d)(v) because it is above the liner and does not catch contaminants going past the liner and into the ground water. To do that NMCC should be required to construct an Interceptor System to function from the beginning of operations with verification that NMCC owns

enough water rights to operate a sufficient system.

Contaminants from this mine threaten both the Perchas and Animas watersheds which drain directly into Caballo Lake and the Rio Grand River. It is your duty to protect the lives and livelihoods of those citizens who depend on the quality of these waters.

Finally, no permit should be granted until an adequate surety bond is negotiated and secured. This site has had many owners who have departed under bankruptcy. All promises of reclamation at the end of operations merely that, promises without an adequate surety bond in place.

William Lindeman
HC 69 Box 101
Hillsboro, NM 88042

Baca, John, NMENV

From: Sharon Dogruel <dogruel@earthlink.net>
Sent: Monday, September 24, 2018 2:17 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I am very concerned about the permit referenced in that the discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam.

Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. I work with many residents in the Mesilla Valley and know how important water is in this area. Contaminated water would be disastrous for this region and beyond.

This permit will allow discharge from eleven years of mining and will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Granting this permit is wrong and New Mexicans will pay dearly for this mistake if it goes through. You have the authority to halt the discharge permit and prevent a serious environmental catastrophe. Please act responsibly.

Sincerely, Sharon Dogruel

Baca, John, NMENV

From: pgnm <pgnm@comcast.net>
Sent: Wednesday, September 26, 2018 8:51 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Stop Copper Flat Mine.
Pat Duncan.
Los Lunas NM

Sent from my Verizon, Samsung Galaxy smartphone

Baca, John, NMENV

From: Brittany Fallon <blfallon@gmail.com>
Sent: Wednesday, September 26, 2018 2:26 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am a voting citizen and I would like this permit to be rejected. Thank you.

Baca, John, NMENV

From: Les Field <lesfield@unm.edu>
Sent: Monday, September 24, 2018 2:43 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern;

As a citizen of the state of New Mexico and the United States, concerned about the scarcity of water in our desert state, concerned about the health and well-being of the plants, animals and people who live here, and appreciative of the natural beauty which I want to see my grandchildren also enjoy, I strong;y oppose New Mexico Copper's plan to discharge 8 billion gallons of horribly contaminated water each year for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars. Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Sincerely,

Les W. Field

Les W. Field

Professor and Chair
Department of Anthropology
University of New Mexico
Albuquerque, NM 87131
Tel #: (505) 277-4524
email: lesfield@unm.edu

Baca, John, NMENV

From: CEG <ceg@plazarealtynm.com>
Sent: Friday, September 28, 2018 7:35 AM
To: Baca, John, NMENV
Subject: [EXT] copper flat discharge permit

Mr. Baca,

Thank you for the opportunity to comment on the above referenced item. I was not able to address the group in person and am grateful that I may include my position on the record. And, while I am the President of the Sierra County Board of REALTORS, I speak to you in my personal behalf, and not in behalf of the Board of REALTORS.

There will be a great deal of prepared data on both sides that will be presented to you I am sure, however, as I understand the purpose of the public hearing being held in Truth or Consequences, NM is to determine the will of the local public and the impact upon them.

Sierra County is one of the poorest counties in one of the poorest states in the Nation, we can go into many directions as to why, however, to focus on Sierra County, with your approval of the permit, and the subsequent approval of the mining operation, you will afford Sierra County to begin establishing an economic base that will allow for the populace of the county to reap the benefits for generations.

Yes, it is anticipated that the mine will produce for around 12 years, however, there will be time before production begins, and time after production ends where individuals will be employed. It will also allow for additional commerce to consider the area, and may introduce entities to our area that have never considered, or, have previously dismissed our community.

Currently there is only one approved subdivision, with infrastructure, in our county where any building is occurring, and there has only been one home built in that subdivision in the last five years.

I ask that you approve the Copper Flat Discharge Permit, it will be a great blessing to our people, homes and community.

Of course, should you have any questions of me please contact me.

Regards,

C. EARL GREER
PLAZA REALTY
P.O.BOX 985 ELEPHANT BUTTE NM 87935
575.744.5140 FAX 575.744.5121 CELL 505.350.1155
www.plazarealtynm.com
twitter cegreer skype cegreer

PLAZA REALTY

Baca, John, NMENV

From: Deborah Guerra <guerra.deb@gmail.com>
Sent: Monday, September 24, 2018 1:02 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

New Mexico Copper

The New Mexico Environment Department Discharge Permit-1840

This permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

Dear Email Hearing Clerk John Baca,

Some of the many reasons to reject this permit

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond

will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Debbie Guerra
Silver City, NM
88061

Baca, John, NMENV

From: Barry Hatfield <barryhat@cybermesa.com>
Sent: Tuesday, September 25, 2018 12:39 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir,

This permit should be rejected.

New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pit-lake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater -- that once was drinking water -- is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

Thank you,

Barry Hatfield

Santa Fe NM
(505) 473-0695

Baca, John, NMENV

From: KrisK <karpaul@mail.com>
Sent: Monday, September 24, 2018 6:44 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern: I would like to state my position as a New Mexico resident that I am totally against approving a discharge permit for the Copper Flat Mine outside Hillsboro. I believe the potential risk to the groundwater is unacceptable. Water is such a precious resource in our state and we need to protect both the quantity and quality of the life giving liquid we still have left. The 24 million gallons per day of contaminated wastewater that will be released if this permit is granted may one day escape into the surrounding groundwater causing pollution that will endanger both people and wildlife possibly for decades to come. It is simply not worth the risk. The permit must be denied!

Kris Karsteadt
3236 Highridge St
Las Cruces, NM

Sent from my iPad

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:02 AM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

My husband and I are residents of Sierra County, NM. We retired here three years ago and own both residential and commercial property in Truth or Consequences, NM. We have lived in the Southwest, including AZ, for over forty years, and also own property in Catron County, NM. We love the Southwest and Southern New Mexico in particular.

We pay close attention to economic, water resource, and environmental issues in the U.S. and the Southwest. This week (Sep 24-28), we attended and listened intently to the NMED hearings held in T or C. **We remain opposed to NM Copper Corp. (Themac Resource Group) reopening the Copper Flat Mine in Hillsboro, NM and the issuance of Discharge Permit 1840. This project would have profound long-term detrimental consequences to the water, environment, and people of New Mexico.**

1. First and foremost, 11 years of mining would use 23 billion gallons of water pumped from wells near the Rio Grande River. Unlike agricultural, municipal, or domestic wastewater, this water will not be returned to the soil to be reused. Municipal and agricultural water users in Southern NM, need every drop of water that exists. As you know, ground water is a significant problem throughout the Southwest and particularly in Southern New Mexico. With good reason, New Mexico is currently being sued by Texas regarding excessive agricultural pumping of ground water that feeds the Rio Grande. Independent of the Copper Flat Mine, this has been a huge issue that will be at the Supreme Court within a few short years. This lawsuit itself is clear evidence that NEW MEXICO DOES NOT HAVE GROUND WATER TO SPARE.

2. Approval of this permit creates a significant threat to Southern New Mexico. It would endanger the Caballo Reservoir and the Rio Grande River and all municipal and agricultural water users in the Mesilla Valley. According to this permit application, 113 million tons of discharge would be contained in a 600 acre tailing pond behind a 2 mile sand dam with a 22 acre pit lake of polluted water at the bottom. Even a minor mishap in the dam or the synthetic liner would cause catastrophic damage to surface and ground water, contaminating what little water we have, endangering all human, plant, and animal life. This would mean decades of constant threat to New Mexico groundwater, wildlife, and economic development.

3. The economic benefit of reopening Copper Flat Mine will not be nearly as great as city county, and state officials and business people hope. New Mexico Copper Corp. has only enough water rights to operate three months per year. This means the environmental and economic threat would continue during decades of intermittent mining. The company says it will employ abut 270 employees. But this relatively low number of part-time low wage jobs are of questionable benefit. Based on the NM Copper Corporation's water agreement with the Jicarilla Apache Reservation, their people would have employment preference. Regardless of where employees originate from or settle, the Copper Flat Mine is at least a 30-60 minute one-way drive from most residential communities. Such part-time intermittent employment would be minimally beneficial to Southern New Mexico. In fact, it is likely the mine would not attract permanent residents but, instead, to result in an increased transient population. Most of the economic benefit of this mine would be to Australian-based CEO's and shareholders that are not even NM residents.

To increase NM Tax revenue, it would be of greater long-term benefit to create policies that would attract sustainable energy companies that will offer long-term revenue and resident employment. The cost/benefit ratio of the Copper Flat Mine "opportunity" is way too high. Given very significant threat to the water, environment, and economy and minimal

economic benefit to the people of Souther New Mexico, we urge the NM Environment Department to disapprove Discharge Permit 1840.

We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:09 AM
To: Baca, John, NMENV
Subject: [EXT] Fwd: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Correction to Subject

---------- Forwarded message ---------
From: **Jaswant Khalsa** <jaswantkhalsa@gmail.com>
Date: Fri, Sep 28, 2018 at 11:02 AM
Subject: In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)
To: <john.baca2@state.nm.us>

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

My husband and I are residents of Sierra County, NM. We retired here three years ago and own both residential and commercial property in Truth or Consequences, NM. We have lived in the Southwest, including AZ, for over forty years, and also own property in Catron County, NM. We love the Southwest and Southern New Mexico in particular.

We pay close attention to economic, water resource, and environmental issues in the U.S. and the Southwest. This week (Sep 24-28), we attended and listened intently to the NMED hearings held in T or C. **We remain opposed to NM Copper Corp. (Themac Resource Group) reopening the Copper Flat Mine in Hillsboro, NM and the issuance of Discharge Permit 1840. This project would have profound long-term detrimental consequences to the water, environment, and people of New Mexico.**

1. First and foremost, 11 years of mining would use 23 billion gallons of water pumped from wells near the Rio Grande River. Unlike agricultural, municipal, or domestic wastewater, this water will not be returned to the soil to be reused. Municipal and agricultural water users in Southern NM, need every drop of water that exists. As you know, ground water is a significant problem throughout the Southwest and particularly in Southern New Mexico. With good reason, New Mexico is currently being sued by Texas regarding excessive agricultural pumping of ground water that feeds the Rio Grande. Independent of the Copper Flat Mine, this has been a huge issue that will be at the Supreme Court within a few short years. This lawsuit itself is clear evidence that NEW MEXICO DOES NOT HAVE GROUND WATER TO SPARE.

2. Approval of this permit creates a significant threat to Southern New Mexico. It would endanger the Caballo Reservoir and the Rio Grande River and all municipal and agricultural water users in the Mesilla Valley. According to this permit application, 113 million tons of discharge would be contained in a 600 acre tailing pond behind a 2 mile sand dam with a 22 acre pit lake of polluted water at the bottom. Even a minor mishap in the dam or the synthetic liner would cause catastrophic damage to surface and ground water, contaminating what little water we have, endangering all human, plant, and animal life. This would mean decades of constant threat to New Mexico groundwater, wildlife, and economic development.

3. The economic benefit of reopening Copper Flat Mine will not be nearly as great as city county, and state officials and business people hope. New Mexico Copper Corp. has only enough water rights to operate three months per year. This means the environmental and economic threat would continue during decades of intermittent mining. The company says it will employ abut 270 employees. But this relatively low number of part-time low wage jobs are of questionable benefit. Based on the NM Copper Corporation's water agreement with the Jicarilla Apache Reservation, their people

would have employment preference. Regardless of where employees originate from or settle, the Copper Flat Mine is at least a 30-60 minute one-way drive from most residential communities. Such part-time intermittent employment would be minimally beneficial to Southern New Mexico. In fact, it is likely the mine would not attract permanent residents but, instead, to result in an increased transient population. Most of the economic benefit of this mine would be to Australian-based CEO's and shareholders that are not even NM residents.

To increase NM Tax revenue, it would be of greater long-term benefit to create policies that would attract sustainable energy companies that will offer long-term revenue and resident employment. The cost/benefit ratio of the Copper Flat Mine "opportunity" is way too high. Given very significant threat to the water, environment, and economy and minimal economic benefit to the people of Souther New Mexico, we urge the NM Environment Department to disapprove Discharge Permit 1840.

We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Thomas Kindig <tokind@gmail.com>
Sent: Tuesday, September 25, 2018 1:14 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Sir,
The permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

One of New Mexico's most endangered resources is groundwater. As our region continues to experience dry conditions which deplete our surface water resources, it would be criminal to risk our groundwater resources in this fashion. Release of contaminated substances to our environment should be met with massive penalties - not permits.

Thanks,

Thomas
- We are as gods and have to get good at it. -Stewart Brand

Dear State Engineer office

I hope you would support the THEMAC's application to open the copper mine at Copper Flats in Sierra County N.M. I support THEMAC because they have taken every present environmental precaution so far that has been brought up to this point in time. I know a lot about environment construction because I worked 8 years as a survey engineer, and 30 years in maintenance.

Sierra County also needs a break to improve our economy, and to give our local people a chance to have an opportunity and a quality learning experience. If you haven't gone to one of THEMAC's meetings you should go for a quality learning experience.

You will also hear from the Citizens Against Virtually Everything (CAVE) groupe and senior citizens who don't want this mine reopened. They have a lot of reasons not to open this mine because they are afraid to look at the real facts, and the fact that they don't want a new group of young people helping to give our county anew and productive start. I would appreciate that you would sign the necessary documents to open the mine at CopperFlats so that we can have an opportunity to revitalize our people and our economy, and stabilize our county.

Sincerely,

Ted Kuzdrowski
PO Box 1445
Elephant Butte, N.M.87935
1-4-17
Email tedletha105@gmail.com

Baca, John, NMENV

From: Cathy Knight <knight.cathy30@gmail.com>
Sent: Friday, September 28, 2018 4:59 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am against the Copper Flat Mine's request because

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

New Mexico does not need anymore bad environmental decisions. I am seeing plenty of them throughout our state. We should be conserving our waters not wasting and poluting them. I grew up in Silver City and had many drives through the beautiful Black Range in route to T or C for weekends at Elephant Butte. Please choose to protect our lands.

Cathy Knight
202 S. Lea Ave.
Roswell, NM 88203

Baca, John, NMENV

From: Robert Johnson <rjwata@gmail.com>
Sent: Tuesday, September 25, 2018 11:07 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I'd like to voice my opposition to Copper Flat Mine's discharge permit 1840, for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Robert Johnson
Albuquerque, NM, USA

Hello. My name is Dan Lorimier and I'm a 40 year resident of Sierra County where I live rurally. I have installed and maintain a private water well to supply my home and property.

Thanks to the Department for holding this public comment session and thanks to the Hearing Officer for formalizing it.

I was involved in the development of the 'Dairy Rule' stipulated agreement with this agency and the NM dairy industry in 2013-14 and 15. From that work, I developed a sense of the importance of synthetic liners with leak detection and recovery. I also became familiar with the problems associated with monitor wells and their after-the-fact pollution detection nature.

I oppose this Groundwater Discharge Permit as drafted and here is one reason: Originally, NMCC planned a double liner system with leak recovery between the two synthetic liners. So, they would have installed a gravel bed, a bottom plastic liner, an under-drain leak collection system plus leak detection sensors, a top plastic liner and then the tailings. The current plan, which is allowed by our new copper rule, calls only for a bed of gravel to hold a single synthetic liner and the tailings. It would also have a very mysterious component - an 'under-drain' collection system installed above the liner. The Department should ask how the planned system could capture and recycle leaks *above* the synthetic liner when its purpose is to recapture leaks between two synthetic liners.

What this plan calls for is actually an 'above-drain' water capture system that pumps water that's inside the tailings pond, to be used for production purposes. Nothing is there to prevent pollution that has made its way past or through the liner from entering the vadose zone and then the groundwater. Rather than prevent groundwater contamination, this plan proposes to install monitor wells. And, if pollution is detected, the company would install 'interceptor wells' to pump up and treat the polluted water. Is their financial assurance sufficient to cover these formidable potential expenses?

With wide agreement that the unlined tailings pond used in the past is currently causing groundwater pollution, shouldn't the Department require this Company to install 'interceptor wells' to treat the existing contamination at the outset of their production phase in addition to their planned monitor wells? Shouldn't this Company install these wells in anticipation of groundwater pollution from their single lined 'dumb' tailings pond that has no leak detection or under-lagoon pollution recycling capacity?

Again, I oppose this plan and this draft permit as written. The department might still fold together their mission to protect and improve our New Mexican groundwater quality while regulating a New Mexican industry as sanctified and ultra-legal as copper mining.

Thanks.

Baca, John, NMENV

From: Michael Madrid <mjmadrid@lcps.net>
Sent: Monday, September 24, 2018 11:16 AM
To: Baca, John, NMENV
Subject: In the matter of Copper Flat Mine's Discharge Permit

Please, please, please don't allow the mining industry to pollute our drinking water! We live in a desert and there are few places where the meme "Water is Sacred" is more applicable than the desert southwest. Our survival in the desert is precariously balanced on the fact that we (I'm including wildlife) rely on clean, safe drinking water.

Please deny Copper Flat's discharge permit. All living things here will thank you.

MJ Madrid

For sale: antique desk suitable for lady with thick legs and large drawers
from Addled Ads in *Anguished English* by Richard Lederer

Baca, John, NMENV

From:	Jan McCreary <mccrearyjan27@gmail.com>
Sent:	Monday, September 24, 2018 2:56 PM
To:	Baca, John, NMENV
Subject:	In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to allowing Copper Flat Mine to create a polluted pitlake and tailings pond because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This is unacceptable.

Sincerely,
Jan McCreary

Baca, John, NMENV

From: Robert McCorkle <frogman3030@gmail.com>
Sent: Monday, September 24, 2018 11:15 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dr. Mr. Baca: I would like my comment to be entered in the record, noting my strong desire to see Copper Flat's discharge permit denied. Allowing 113 million tons of copper tailings to be contained behind a 2-mile sand dam for more than a decade is inviting catastrophe that could adversely impact the drinking water of tens of thousands of us living in the Mesilla Valley. That's a risk not worth taking. Wildlife, too, will be negatively impacted by the polluted tailing pond. Furthermore, the immense quantity of fresh water that would be used in the mining operations for the next decade would be much better used to sustain an ample water supply for agricultural and domestic uses. A front-page story today in the Las Cruces Sun-News noted that due to prolonged drought and lack of snow runoff into the Rio Grande this past winter (the least runoff since the dam was built in the early 20th century), Elephant Butte Reservoir is at 3 percent capacity. Under this scenario, if sustained, the importance of groundwater will be greatly elevated. Allowing Copper Flat Mine to pump 23 billion gallons of water from the aquifer over 11 years is nothing short of insanity. Permit 1840 should be rejected.
Thank you,
Robert McCorkle
Las Cruces, NM

On the Hearing before the Secretary of Environment in the matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. 8WB-18-06(P)

Attention: Hearing Clerk John Baca

Dear Mr. Baca,

We are writing to express our concern about the proposed reopening of the Copper Flat Mine, in particular regarding the Discharge Permit (public notice #2, 2/2/2018, DP#1840). As residents of Kingston, NM, we live only about 10 miles from the mine and have an apple orchard and ground- and surface-water right, so the health of the local environment and the availability and quality of local water resources are important to us. As professional hydrologists, water resources in general are important to us as well. Although we have limited familarity with local hydrogeology in the Copper Flat Mine area, one of us (Van Metre) has 38 years of experience in water quality and sediment chemistry, a Masters Degree in Hydrology from the Univ. of Arizona, and a PhD in Geology from the Univ. of Rouen, France. The other (Mahler) has 25 years of experience in aqueous geochemistry and hydrogeology, with a Masters and PhD in hydrogeology from the Univ. of Texas.

The discharge permit request states that "New Mexico Copper Corporation, proposes to discharge up to 25,264,000 gallons per day (25 MGD) of mine tailings, process water, impacted stormwater, and domestic wastewater to a lined tailing impoundment. ... Potential contaminants from this type of discharge include sulfate, nitrate, total dissolved solids, and metals." We think there are important questions to be answered regarding this request. These include:

1. 25 MGD translates to filling the existing tailings impoundment, about 1 square kilometer in area, with 120 feet thickness of water and tailings over the course of a year. What portion of the 25 MGD is water that must be evaporated to avoid eventual outflows? Annual evaporation is expected to remove only about 6 feet of water. What becomes of the remaining 114 feet of water and tailings? Or over 5 years, 570 feet of water and tailings? The existing tailings impoundment is about 150 feet above the land surface (per the 1996 USGS quadrangle map); how much does NMCC propose to increase the size of the impoundment to accommodate all this material for how many years of mining? We are unclear on how NMCC is proposing to handle the level of discharge requested in the permit.
2. What is the proposed source of the water in the 25 MGD that will be discharged? If a substantial portion of this water will be pumped from the pit as part of the dewatering operations, how will the resulting change in water level affect the groundwater flow system in the area? What will the quality of that water be? The report produced by SRK Consulting (SRK Project Number 19100003; 2018) cites elevated concentrations of copper, sulfate, chloride, TDS, manganese, cobalt, fluoride, sodium, and potassium in pit lake water as a result of periodic Acid Wall Seep (AWS) events. For example, Figure 1.9 in that report shows a maximum copper concentration in the pit lake of 26 mg/L in 2013; the USEPA Maximum Contaminant Level for copper for drinking water is 1.3 mg/L.

We have additional concerns and questions about contradictory information on the hydrologic setting of the mine in the environmental engineering reports that are the foundation of the mining plans and the

Discharge Permit. Two documents from the public record describe the geology and hydrology of the Copper Flats mine site and, specifically, the pit lake. These documents are inconsistent—which one is incorrect? The letter from Shoemaker and Associates to Ms Katie Emmer, dated June 25, 2015, responding to questions raised about the rapid fill scenario, includes and relies heavily on the figure reproduced below (Figure 1). This data and modeling exercise indicates that the groundwater level in the pit will have stabilized at about 4900 feet (amsl) 100 y after mining and a difference in groundwater level from the pit lake to the eastern local maximum of 200-250 feet, which would drive groundwater flow in the direction of the pit. The authors conclude that more than ***20 feet*** of rain on the pit and surrounding drainage area to reverse that gradient and cause pit water to flow into the regional groundwater system.

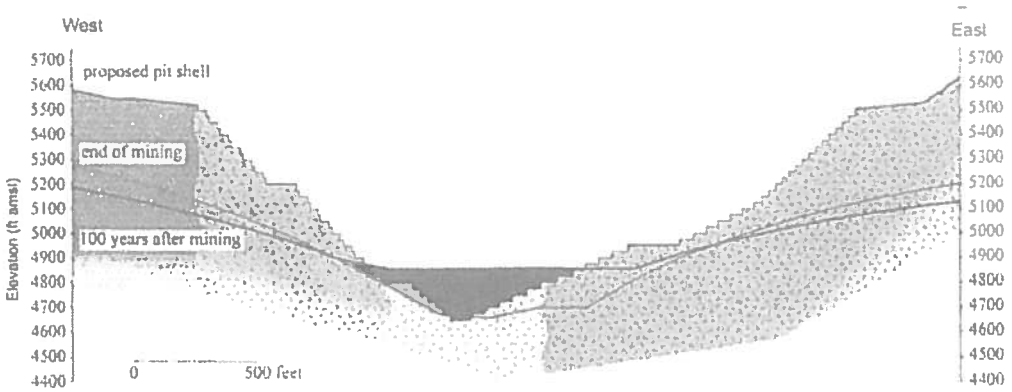
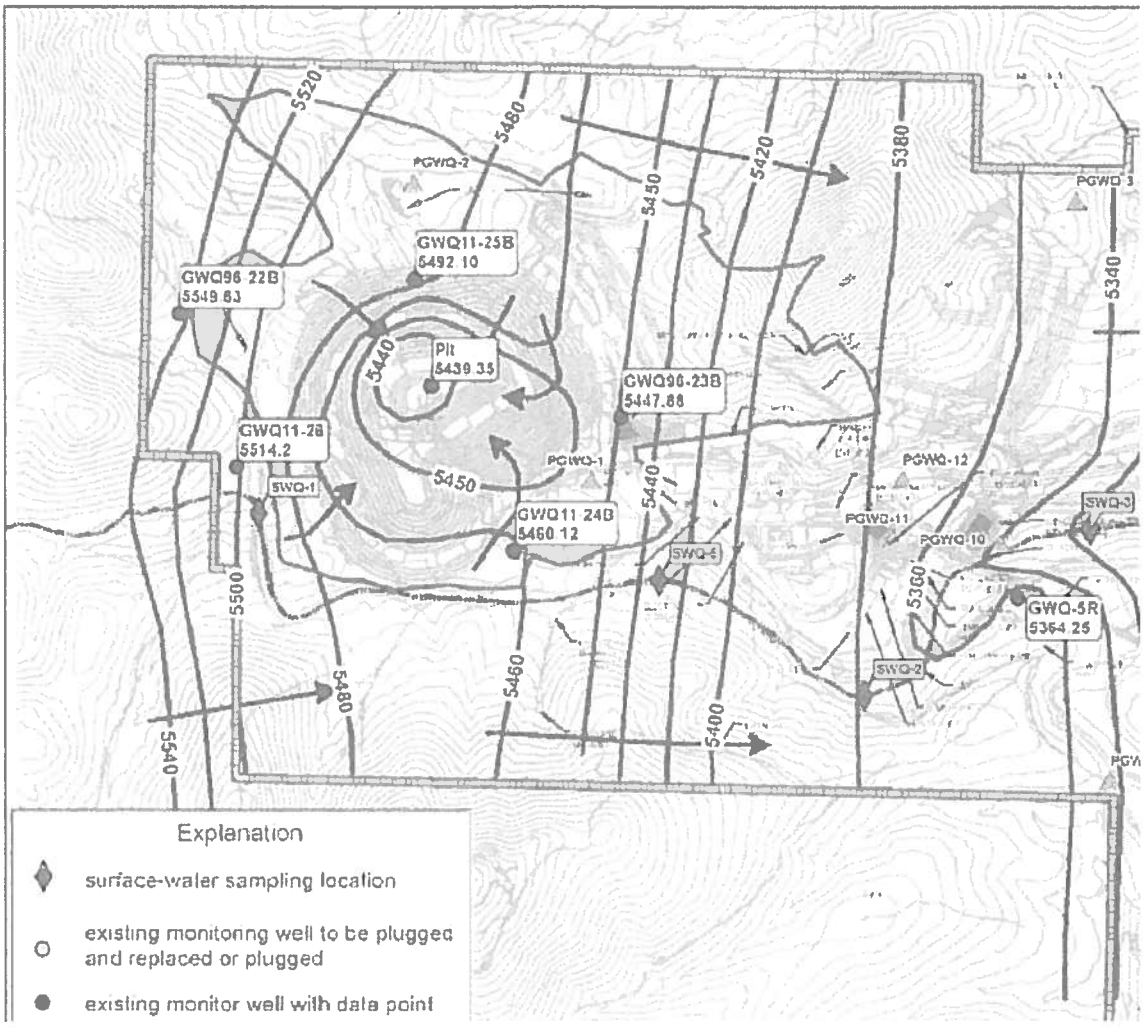


Figure 1. West-to-east profile of post-mining water levels across the open pit.

Figure 1 indicates that the highest water level down-gradient (east) of the pit is always above elevation 5,100 ft amsl. The long-term pit water elevation fluctuates near elevation 4,850 ft amsl, with maximum water elevation of 4,900 ft amsl occurring at the end of rapid fill. To create a flow-through system, water level in the pit would have to exceed elevation 5,100 ft amsl.

However, a figure in NMCC report DP-1840, dated 2018, (Figure 2, reproduced over the mine pit below) shows the current potentiometric surface (groundwater level) at the mine site in map view based on monitoring wells. In this document, the groundwater level at the center of the pit is 5440 feet (amsl), whereas in the Shoemaker and Associates letter the groundwater level in the pit is given as 4900 feet, a different of more than 500 feet. Why would the pit water level stabilize more than 500 feet lower after the next round of mining compared to where it is now? In the NMCC report, the nearest monitoring well to the east, regionally down-gradient, is 5448 feet—just 8 feet above the level in the pit. This indicates that only a small change in water level in the pit relative to the surrounding groundwater level, less than 10 feet, would reverse flow direction, compared to the change of 200-250 feet cited by Shoemaker. The very large inconsistencies between the modeling results presented in the Shoemaker letter and the current groundwater levels raise crucial questions regarding the reliability of the hydrologic assessments that underlie this permit request.

Figure 2 – Ground and Surface Wa



Sincerely,
Dr. Peter Van Metre
Dr. Barbara Mahler
35 Kingston Main Street
Hillsboro, NM 88042

Baca, John, NMENV

From: Edward LeBlanc <el2@twenty15.com>
Sent: Monday, September 24, 2018 2:08 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

After reading about the proposed discharge permit 1840, I had to ask myself if we have lost our collective minds to even consider such a permit!

Coincidently just about a month ago, I showed my 17 year old son some information about the Berkeley Pit and Yankee Doodle tailings pond on the edge of the city of Butte, Montana. Apparently a lot of people thought that was a good idea at first. Now everybody sees that it was clearly a bad idea because it is a superfund site. It is so polluted that it kills birds unfortunate enough to landing on the water.

So that was in 1955, and apparently we have collectively still not learned enough from this and similar atrocities to stop doing this kind of thing. Someone will surely claim that the proposed discharge permit for the Copper Flat Mine is different, perhaps claiming that the "modern techniques" would not cause the same problems, but any such arguments would be naive.

What is being considered is to knowingly permit a future superfund site. This cannot be allowed! It is too dangerous.

With all due respect,
Sincerely,
Edward LeBlanc

531A Dolores St.
Santa Fe, NM
87501
505-471-9176

Baca, John, NMENV

From: Ben Lewis <hillbro48@gmail.com>
Sent: Monday, September 24, 2018 6:12 PM
To: Baca, John, NMENV
Subject: Comments on Draft Discharge Permit Copper Flat Mine
Attachments: HMDWCA Comments on Discharge Permit for Copper Flat Mine.pdf

Please find attached the Association's comments on the above referenced permit. We would ask that our comments be added to the record of the Hearing.

Ben Lewis, President
Hillsboro MDWCA

Baca, John, NMENV

From: Dan Maxwell <swex@cybermesa.com>
Sent: Friday, September 28, 2018 1:34 PM
To: Baca, John, NMENV; Jeffrey Smith
Subject: [EXT] comments on Copper Flat discharge permit

I have worked in New Mexico as a mining engineer for 43 years, and during my career, I have witnessed the mining industry shrink at an alarming rate. Along with this demise goes the tax base of our rural communities to the point of near extinction for some; just ask the folks in Grant, Hidalgo, Luna, Cibola, McKinley, San Juan, Colfax, Taos and Eddy Counties.

As an alternative to this "old" resource economy, the green community has re-packaged another old idea in its buzz phrase of a "recreation economy". But the jobs in this "Tourism" sector are largely seasonal, low skill and low pay, which leads to further strain on public coffers to support workers during off-season periods of unemployment. With Elephant Butte Lake as an example, long-time Sierra County residents know this all too well; many in the community survive off one assistance program or another during slow periods.

As a major producer, Copper Flat would go a long way towards improving the economy of Sierra County with long-term, skilled, high-paying jobs, and beyond the planned 10-15 year mine life, proposed operations may reveal additional resources for the future. Loud, emotional hyperbole is difficult for the Department to ignore, but from my knowledge of the contents of NMCC's discharge permit application, I support NMED's approval of the Plan on its technical merits.

If you have questions, please email the address above, or call me at 575-537-9594.

Sincerely, Dan Maxwell.

Baca, John, NMENV

From: Peter Van Metre <pcvanmet@gmail.com>
Sent: Thursday, September 27, 2018 4:41 PM
To: Baca, John, NMENV; bjmahler59@gmail.com
Subject: [EXT] Comment on Discharge Permit 1840 for Copper Flat Min
Attachments: Copper Flats comment from Van Metre & Mahler.docx

Dear Mr. Baca,

Please find the attached comment on the subject Discharge Permit request.

Regards,
Peter Van Metre and Barbara Mahler

P. O. Box 786 • 1400 North Date St.
(505) 894-6200
Truth or Consequences, New Mexico 87901

9/27/2018

Felicia Orth,

My name is Robert Middleton. I was born here in Hot Springs (now Truth or Consequences), New Mexico. I own Los Arcos Steak and Lobster Restaurant in T or C. and have been in business here for over 48 years. I did not have a chance to speak at the NMCC Copper Flat Mine Groundwater Protection Discharge permit. Thanks for allowing me to submit a written statement.

I have strong feelings about the positive economic impact that it will have on our struggling community and have seen the positive economic impact personally here in Sierra County. I was in business at Los Arcos in the late 70's and early 80's while the Quintana Mine was in the construction and production phase. It was the only time in the last 48 years that I have seen a significant economic impact in my business and in our community. Our community was flourishing due to workers with good paying jobs and paychecks to spend here in our community. It would be wonderful to see that again and for our youth to have the opportunity of choice to remain in our community without leaving for employment elsewhere as we have seen for years.

Thank you for your consideration.

Sincerely,

Robert Middleton

Robert Middleton (owner)
Los Arcos Steak and Lobster

Baca, John, NMENV

From: Debora Nicoll <4ncx123@gmail.com>
Sent: Thursday, September 27, 2018 4:14 PM
To: Baca, John, NMENV
Subject: [EXT] DP 1840, Docket 8WB-18-06(P), copper flat mine

Dear Secretary of Environment,

I am Debora Nicoll, (105 Caje Trail Rd, Hillsboro NM 88042) and am writing regarding the discharge permit 1840 for copper flat mine in Hillsboro NM, Docket No. 8WB-18-06(P). I am a retired biomedical researcher with a BS in chemistry and a PhD in biology.

I oppose your granting this permit. The mine owners seem very vague about how they propose to deal with the "pit lake" after mining. In their environmental impact statement, they have referred to the current pit lake as an environmental sink with water inputs coming from groundwater and precipitation and with evaporation exceeding those inputs. This, of course means, that any contaminants in the pit lake are becoming more concentrated with time. The mine company also mentioned that the current pit lake already has displayed elevated levels of a number of metals including aluminum, lead, cadmium and zinc. The mining company states that because of this, the pit mine does not meet standards for uses in warm water aquatic habitat, livestock watering or for wild life habitat.

The mining plan includes pumping water from the pit lake and using it on the walls of the mine to control dust. I understand this to mean that they will pump the contaminated water from the bottom of the pit and spray it on the roads leading down into the mine. That water will pick up additional contaminants while draining back to the bottom of the pit and those contaminants will become more concentrated with time.

The pit lake is in contact with groundwater as evidenced by the input of groundwater to the pit lake. Since this is so, that also means that the contaminants in the pit lake can diffuse into the ground water and flow, most likely into the direction of Lake Caballo and the Rio Grande, or, perhaps more alarmingly, into the wells, seeps and springs that are used by local human and non human residents.

It seems that the best way to deal with the pit lake after mining would be to backfill the pit and bring the area back up to contour. This is exactly what the mine company says it is <u>not</u> doing. Instead, they propose to allow the lake to fill and to plant trees and other landscaping and make it accessible to wildlife. This sounds like a perfect recipe for ridding the area of all the local fauna.

Given all these points, I must highly encourage you not to approve discharge permit 1840, docket no. 8WB-18-06(P) for the copper flat mine.

Thank you
Debora Nicoll

Baca, John, NMENV

From: Shannon Patrick <xannin2@yahoo.com>
Sent: Monday, September 24, 2018 1:41 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please reject this permit because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you,
Shannon Patrick, MA, M.Ed., MLS
Las Cruces NM

Baca, John, NMENV

From: Daniel Richards <dprichards42@gmail.com>
Sent: Monday, September 24, 2018 4:25 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Attention Clerk John Baca,

This permit is totally unacceptable for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

I trust that the evidence for how destructive to people, wildlife and environment will make denying this permit a forgone conclusion. Please present my comment at the appropriate time in this hearing

Daniel Richards, 42 Chamisa Rd, Mimbres, NM 88049

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Subject: FW: [EXT] Copper Flat permit

John,

For the Copper Flat Hearing record

From: shdooley@aol.com <shdooley@aol.com>
Sent: Thursday, September 27, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: [EXT] Copper Flat permit

The New Mexico Environment Department is holding a public hearing on the discharge permit for the Copper Flat mine in Hillsboro.
The hearing will consider a proposed groundwater discharge permit prepared by the Environment Department in response to a permit application submitted by New Mexico Copper Corporation for discharges from the proposed Copper Flat Mine. The draft permit authorizes the mine operator to discharge 22.3 million gallons per day of tailings, mining impacted and domestic wastewater that could contain contaminants and toxic pollutants above state standards.

The draft discharge permit for the Copper Flat Mine is inadequate. It should be denied, but *at a minimum the permit needs to be re-written with conditions* for the following reasons:

- **Incomplete Characterization** – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. ***The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.***

- **State Water Quality Standards Must Apply** – The draft permit assumes that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. ***The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.***

- **Groundwater Monitoring Is Inadequate** – Even though NMED has added two additional groundwater monitoring wells, the total number of wells and their location are still inadequate. ***The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and/or the tailings storage facility.***

- **Hazard to Public Health and Undue Risk to Property and Public Safety**

- The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.
- The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

- **Streams Important for Wildlife, Including Endangered Species**– Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

- **Financial Assurance**– The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the company default, pushing the costs of cleanup onto taxpayers.

Susanne Hoffman-Dooley
Santa Fe, NM
shdooley@aol.com

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:41 PM
To: Baca, John, NMENV
Subject: FW: New Mexico Copper Flat Mining -horrid idea

From: Fiona Van Reisen <fiona@fionavanreisen.com>
Sent: Sunday, September 16, 2018 3:34 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: New Mexico Copper Flat Mining -horrid idea

Mr Reid,

Please do not go to your grave knowingly allowing this wrong to the environment. It's a lose lose and there's no coming back.

Got a conscience? It will hurt many people as well as ruining the landscape.

Please consider yourself as able to stop a wrong.

Fiona van Reisen

Baca, John, NMENV

From: Peter Roche <sunmtnsft@aol.com>
Sent: Monday, September 24, 2018 2:16 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to the issuing of the permit in that I think that the mine discharge tailing pond represents an unacceptable risk to the water in the Caballo Resevoir and the Rio Grande for decades to come. Also the open tailings pit will represent a hazard to wildlife for decades or more.

Peter Roche,
Santa Fe, NM

Baca, John, NMENV

From: Adrienne Ross <ahlight@gmail.com>
Sent: Monday, September 24, 2018 9:26 PM
To: Baca, John, NMENV
Subject: "In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)."

Dear Mr. Baca,

I respectfully request that you deny Copper Flat Mine's discharge permit and protect our precious groundwater for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you for your consideration and cooperation on behalf of all New Mexicans.

Sincerely,
Adrienne Ross

Baca, John, NMENV

From: JMR <jmr@pwross.com>
Sent: Monday, September 24, 2018 11:45 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

My name and address are as follows:

James Ross

PO Box 16258

Las Cruces, NM 88004

I am Against Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

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3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Baca, John, NMENV

From: Miranda Roussel <mirandaraven@gmail.com>
Sent: Monday, September 24, 2018 9:53 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P).

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Please reject the permit. My family lives on Animas Creek and they use the ground water for drinking. Please don't let mining prospects threaten my family.
Thank you,
Miranda Roussel

Baca, John, NMENV

From: John Saridan <john.saridan@gmail.com>
Sent: Monday, September 24, 2018 6:28 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hearing Clerk John Baca,

If this permit is allowed for Copper Flat Mine near Hillsboro NM, it would allow New Mexico Copper Corp. to discharge 24 MGD of contaminated wastewater that can move directly or indirectly into the groundwater. The effluent discharge will be contained in a 600-acre pond behind a 2-mile sand dam. If a break occurs in the retaining dam or its synthetic liner system, it will cause catastrophic damage to surface water and groundwater to the east and south of the mine. It will endanger the Caballo lake and the Rio Grande river and therefore all municipal and agricultural water users in the Mesilla Valley. A threat to citizens, wildlife, agriculture and the economy will occur for many decades past closure, when the 24 billion gallons of wastewater is finally evaporated and the pond area buried. Remember this could have been used for drinking water!

The New Mexico Copper Flat Mine has only enough water rights to operate three months every year. This company projects an 11-year operation. Actually it will mine intermittently for decades. During that protracted period, Copper Flat Mine will remain not fit for use, the polluted pit lake and the pond will be a constant threat to New Mexico wildlife and New Mexico groundwater.

11 years of mining will depend upon approximately 23 billion gallons of water pumped from groundwater wells near the Rio Grande River. This pumping will impair the river's flow, enlarge New Mexico's liabilities in Texas' lawsuit challenging our state's management of the river, and can cost New Mexico taxpayers millions of dollars.

Best Regards,
John and Michele Saridan
3901 Sonoma Springs Ave Unit # 1211
Las Cruces, NM 88011

Baca, John, NMENV

From: Melody Sears <tunessears@gmail.com>
Sent: Monday, September 24, 2018 8:55 PM
To: Baca, John, NMENV
Subject: For Secretary of the Environment Re: the Hearing on the Matter of Discharge Permit 1840 for Copper Flat Mine

I am a resident of Hillsboro, NM, unable to attend Hearing Meetings due to a previous commitment out of state. I served for four years on the Board of Hillsboro Mutual Domestic Water Consumers Association (HMDWCA) and am extremely concerned about pollution of groundwater from Copper Flat Mine operations if the Discharge Permit is approved by NMED. I currently oppose approval of New Mexico Copper Corporation's application based on the following:

1. The present pitlake is polluted and during NMCC's operation of the mine, should it be permitted to operate, the pitlake waters will also be contaminated. It is my understanding that the NM Copper Rule currently suspends the normal standards of allowable contamination while the mine is operating, but if the mine only operates intermittently, based on variable copper prices, then what will happen with the polluted pitlake water? Is NMCC then required to revert to normal standards of contamination in the pitlake water until mining activity resumes? If not, why not? And if mine operations do not resume within a reasonable time frame (6 months? 1 year?) then is NMCC required to begin remediation efforts? If not, why not?
2. The mine currently has been granted only enough water rights to operate for about 3 months of the year and is involved in an appeal regarding that decision. Nevertheless the discharge permit application is based on NMCC's calculations of discharge and contamination for a mine life of 11 continuous years of operation. NMED would be derelict in its duty if it issues a discharge permit until the appeal mentioned above has been decided.
3. If NMCC were to go into bankruptcy there should be measures in place before being granted a discharge permit by NMED requiring that a fully funded bond or some other surety be established to ensure that remediation of the pitlake and tailings pond will be done within a reasonable time frame (2 years?) despite abandonment of the mine or cessation of operations. Again, NMED would be derelict in its duty if it issues a discharge permit before the appeal mentioned above has been decided and it is clear whether or not NMCC will have enough water rights to operate fully each year for 11 years, which their discharge permit application calculations are based upon.
4. Finally, the existing tailings pond has no HDPE liner and has been leaking contamination into groundwater for the past 35 years. An interceptor system should be required of NMCC and put in place before they begin mining operations, rather than waiting for new monitoring wells to detect new contamination. This requirement must be based on the certainty that NMCC owns sufficient water rights to operate an interceptor system correctly sized for their 11 years of full-time operations.

Thank you for your attention to these concerns.

Sincerely,
Melody Sears
10792 Highway 152, Hillsboro NM 88042

Baca, John, NMENV

From: deb shekter <dtshekter@yahoo.com>
Sent: Tuesday, September 25, 2018 8:25 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please do not allow this permit for Copper Mining! Look at what happened in Butte, Montana - the Berkeley Pit!
Let's think about the long term effect this will have on our environment in New Mexico and Texas. By long term, I mean decades and decades from now. Please do not allow this to happen.

Respectfully submitted, Deborah Shekter

GILA RESOURCES INFORMATION PROJECT

20 Years of Promoting Healthy Communities by Protecting Our Environment

September 28, 2018

Brad Reid, Permit Lead
New Mexico Environment Department
Ground Water Quality Bureau
1190 South St. Francis Dr.
PO Box 5469
Santa Fe, NM. 87502

Via e-mail: brad.reid@state.nm.us

RE: Public Comment on Copper Flat Mine Discharge Permit (DP-1840)

Dear Mr. Reid:

I am submitting the following public comments on behalf of the Gila Resources Information Project (GRIP) regarding the Copper Flat Mine Discharge Permit (DP-1840). GRIP was unable to attend the public hearing in Truth or Consequences and provide oral comments. I am therefore submitting them in writing.

GRIP is very concerned that the draft discharge permit DP-1840 will not adequately protect surface and groundwater quality in the vicinity of the Copper Flat Mine. We believe the draft permit should be denied or re-written with appropriate conditions to protect water resources.

- **Require full characterization of bedrock underneath the mine site** – The mine operator has not conducted an adequate characterization of the bedrock underneath the mine. It is unknown the magnitude of the potential for pollutants to move through the ground, contaminating groundwater that serves as the area's water supply. Based on the extensive experience at Grant County copper mines with mine-impacted groundwater moving into the regional aquifer or offsite, the draft DP-1840 should require extensive evaluation of the geology underneath the mine to understand the potential for transport of mine effluent and to in turn develop appropriate permit conditions to protect groundwater.

- **Mandate that state water quality standards apply** – The draft permit assumes that the mine pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will likely combine with clean groundwater and extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

- **Expand groundwater monitoring network at mine site** – We concur with NMED's requirement for two additional groundwater monitoring wells, but we believe this is still insufficient to reliably detect contamination discharged from the mine's waste rock piles and the tailings storage facility. As seen at the Tyrone mine, mine-impacted groundwater has moved across a fault line that was thought to be a barrier to groundwater movement. Contamination has also moved into the regional aquifer. Because the monitoring network is not dense enough, this contamination was able to move downgradient without being detected until much later. An effective monitoring network is critical to the capture system that will contain discharges from the Copper Flat mine site. GRIP believes that the monitoring network must be expanded to properly detect discharges from the mine site.

- **Ensure that streams important for wildlife and endangered species are protected** – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species. We are particularly concerned that stormwater management plans at the Copper Flat mine take into consideration climate change predictions of increased frequency of severe precipitation events. Best management practice recommends that design standards use a 200-year/24-hour storm event. More severe 500-year storm events have already occurred in the region. Permit conditions should reflect the reality on the ground.

- **Require adequate financial assurance to protect the state, taxpayers and local communities** – The proposed financial assurance in the draft permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the mine operator default. Cost estimates should be developed assuming monitoring and maintenance for at least 100 years, and sufficient financial assurance put in place to cover these costs.

Thank you for your consideration of our comments.

Sincerely,

Allyson Siwik
Executive Director

Baca, John, NMENV

From: Vollbrecht, Kurt, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Cc: 'Allyson Siwik' (grip@gilaresources.info); Reid, Brad, NMENV
Subject: FW: [EXT] Copper Flat DP-1840 - GRIP Public Comments
Attachments: GRIP-CopperFlat-DP-1840Hearing.pdf

Hi John,

Please find attached comments from GRIP regarding the draft DP-1840 proceeding.

Thanks Allyson.

Kurt Vollbrecht, Program Manager
Mining Environmental Compliance Section
Ground Water Quality Bureau
New Mexico Environment Department
(505) 827-0195

From: GRIP <grip@gilaresources.info>
Sent: Friday, September 28, 2018 4:21 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Cc: Vollbrecht, Kurt, NMENV <kurt.vollbrecht@state.nm.us>
Subject: [EXT] Copper Flat DP-1840 - GRIP Public Comments

Good afternoon, Brad:

Please find attached public comments from GRIP on the Copper Flat mine DP-1840. I was unable to attend the hearing this week in TorC given a family health emergency.

Thank you for your consideration of our comments.

Allyson Siwik, Executive Director
Gila Resources Information Project
305A North Cooper St.
Silver City, NM 88061
575.538.8078 office/fax
Www.gilaresources.info

Baca, John, NMENV

From: Donald Smith <pithouse@outlook.com>
Sent: Monday, September 24, 2018 11:36 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumpedfrom wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water."

Donald H Smith

Baca, John, NMENV

From: Chris Spigarelli <eldoradosf@yahoo.com>
Sent: Monday, September 24, 2018 6:52 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello Sir: This permit is a totally NOT environmentally safe or smart idea. As often happens, big business wants to steam roller over safety of the precious life-sustaining water, neglecting to see the results of this huge water waste & dumping the toxins back into the NM water supply. This will endanger the current humans & wildlife plus generations to come. Please take my comments into account...many NM citizens feel the same way, even though they might not comment.

Thank you sincerely, Chris Spigarelli from T or C

Sent from my iPad

Baca, John, NMENV

From: Laverne S. Stinnett <dancingswanjewels@gmail.com>
Sent: Tuesday, September 25, 2018 12:25 PM
To: Baca, John, NMENV
Subject: [EXT] "In the matter of Copper Flats Mine discharge permit 1840, docket number 8WB-18-06 [P]"

To all who are involved with this project, I live on Animas Creek, located south of this mine. I live with 300+ year old Arizona Sycamores on this property. They are ancient, beautiful wise sentinels in the creek, their life much longer then ours...and I want them to live in good health on this creek for future generations to enjoy. They are NOT replaceable. These trees are a treasure worth far more then a mine which rips up the landscape and pollutes our water. I feel we have a moral responsibility to this Earth, our home to care for & preserve it. Let morals rule, NOT MONEY. I feel this whole thing is about greed and money. I am VERY VERY opposed to this mine being operational. Our water table here on Animas Creek is already somewhat polluted from the original mine operation. WHO is responsible for cleaning it up?? Empty promises ...why should we all believe it will be 'different' this time?? NO,NO,NO!

Laverne S Kennedy
395 Animas Creek Road
Caballo N.M.
575-649-3424

State of New Mexico

Shelly Trujillo
County Clerk
575-894-2840

Terri Copsin
County Treasurer
575-894-3524

Keith W. Whitney
County Assessor
575-894-2589

Tom Pestak
Probate Judge
575-894-2840

SIERRA COUNTY
NEW MEXICO

855 Van Patten Street
Truth or Consequences, New Mexico 87901

Bruce Swingle, County Manager
575-894-6215 voice 575-894-9548 fax

County of Sierra

Kenneth Lyon
Chair
575-894-6215

Frances Luna
Commission Vice-Chair
575-894-6215

Jim Paxon
Commissioner
575-894-6215

Glenn Hamilton
County Sheriff
575-894-9150

NM Environment Department
Copper Flat Mine Ground Water Discharge Permit Public Hearing
September 24-28, 2018

My name is Bruce Swingle, County Manager for Sierra County and I am speaking on behalf of the Sierra County Board of County Commissioners. The Sierra County Commission has and continues to support Copper Flat Mine. In determining whether to support the Mine, as a matter of public policy, County leadership relied on much data and information presented by many credentialed professionals. Professionals with extensive experience and expertise.

After assessing New Mexico Copper Corporation's (NMCC) business model and environmental safeguards, the county commission has approved two resolutions of support for the Mine. The City of Elephant Butte and Village of Williamsburg also approved resolutions of support. Suffice it to say, the vast majority of Sierra County residents support the Mine.

Today, NMCC gave an impressive presentation on Copper Flat Mine operations and mitigation plans to protect the environment and area resources.
Let us not forget, NMCC is trying to reopen a mine that has been operating on and off for generations, in an area where the mining of copper and other precious metals has been a part of this community since the 1880's. Mining, particularly at the Copper Flat Mine site is culturally and historically connected to Sierra County. Hillsboro was originally selected as Sierra County's, county seat, only because of mining and the mining population in the area.

Many misrepresentations are circulating about how the Mine will harm the Rio Grande Valley. These misrepresentations are intended to scare people and create hysteria against the Mine. The fact is NMCC is committed to responsible mining and implementing reasonable environmental protections to safeguard our community and state.

One of the misrepresentations is that due to a water contract, the Mine is required to hire only members of the Jicarilla Apache Nation. "Indian Preference" language is common boilerplate language in contracts with Native American entities. As a former County Manager in McKinley County, I entered in to a number of contracts with similar language. "Indian Preference" simply means that if you have two candidates with equal skills, experience and suitability, you hire the Native American. You hire the candidate that is best qualified and best suited for the job, which of course could be a Jicarilla Apache member.

Regardless of the contract with the Jicarilla's, the Mine will need to hire many skilled workers from outside the county. Sierra County does not have enough skilled workers in the mining industry to satisfy the Mine's needs. Growing our community's population is an intended benefit we welcome.

Another misrepresentation is that NMCC will bus employees to the Mine from various areas of the state. Thus, no or limited Sierra County residents will be employed. The truth of the matter, creating vanpools to transport workers to the job site is positive for all concerned. Transporting workers from T or C to the Mine decreases traffic and serves as a benefit to employees. The St. Cloud Mine and many other operations around the state use vanpools.

The final misrepresentation I will discuss is about mining camps. This misinformation claims that no Mine employees will live or shop in our community, and that Mine employees will be forced to live, work and shop on Mine property. NMCC is not creating mining camps in Sierra County; although, mining camps, research camps, oil and gas field camps, and the like, serve a purpose in extremely remote areas. Copper Flat Mine is not in an extremely remote area.

Sierra County and the State of New Mexico need Cooper Flat Mine. New Mexico and Sierra County rank at the bottom of most socioeconomic measures. Copper Flat Mine can single-handedly change the economic landscape in Sierra County and vastly improve New Mexico's economy, without compromising the environment.

Sierra County's "Per Capita Income" is a meager $20,495, while the National rate is over twice that of Sierra County at $58,030. Sierra County is truly one of the poorest counties, in one of the poorest states.

The county's "Median Household Income" is $29,679, substantially lower than New Mexico's rate of $46,748. The National "Median Household Income" rate is even higher at $59,039.

New Mexico has the 2nd worst "Poverty" rate in the United States at 20.4%. The National "Poverty" rate is 12.7%, while Sierra County's "Poverty" rate is over 22%. 22.1%

The "Mean Property Value" in Sierra County is $89,900, compared to New Mexico's at $167,500. Properties are not selling and there is virtually no new construction in Sierra County.

As of March 2018, Sierra County's "Unemployment" rate was 8.8%, compared to New Mexico's rate of 5.6%.

To compound the issue, Sierra County is losing its population. The county's population has declined about 19%, since 2000. Unfortunately, without the Mine and similar economic development projects that create jobs, the county's population will continue to decline.

Currently, our youth leave the community to seek meaningful employment, while our skilled workers work for far less than they can make in nearby communities. One cannot blame our youth and skilled workforce for leaving; they must work and receive reasonable wages.

From a public policy perspective, the only thing worse than the out migration of residents, is for

residents capable of working to stay in Sierra County. If they stay, they will remain unemployed or under-employed and survive on some form of government welfare or social assistance program.

Sierra County needs this Mine. Copper Flat Mine will provide a significant economic boost to Sierra County and New Mexico through job creation and tax revenues. The Mine will create approximately 1,300 direct, indirect and induced jobs. Copper Flat Mine is expected to create 275 direct jobs, making it the largest employer in the county. The estimated **taxes** paid over construction and life of the Mine is approximately $175 million.

Property taxes alone are projected to exceed 6.5 million dollars. In a county that only collects 8 million dollars a year in property taxes, the Mine's taxes will equate to improved services, better quality of life for our residents and provided much needed revenue to our schools.

The Mine will stimulate population growth, improve employment rates, increase earnings per capita, positively affect our housing market, improve the quality of life of area residents, and certainly affect other key-industries in the area, such as, construction, retail, arts, entertainment, recreation, health care, and tourism.

The entire state will benefit from Copper Flat Mine. As of February 2018, NMCC has spent 38.8 million dollars in New Mexico. Of that, $3.4 million in Sierra County, $12.6 million in Albuquerque and $22.8 million in other areas of the state.

With respect to the environment, we are all environmentalists. We all want to protect our natural resources; these resources sustain our way of life and our culture. However, if someone is against mining because of a belief that all mineral extraction is an assault on the environment, they will never support Copper Flat Mine or any other mine for that matter.

Reasonableness must prevail. Mining is accomplished all over the country without harming the environment. After hearing NMCC's presentation, reasonable people will agree that NMCC is implementing reasonable safeguards to protect the environment and our community.

This environmental debate reminds me of the **Dakota Pipeline protests** in 2016. Extremists, and I do not use the term "extremist" carelessly or irresponsibly... Extremists from around the country reacted to construction of an oil pipeline running from North Dakota to southern Illinois. In reality, it was a pipeline similar to the 2.4 million miles of energy-pipeline running across this country. This specific pipeline created no greater threat than any other pipeline to the environment, but these individuals, failed to reason and believed this particular pipeline would cause irreparable harm to the environment.

Folks, you are seeing an extreme element that will not reason or rationalize facts. They are against the Mine no matter what measures NMCC employs. They believe mining, in any fashion, will destroy the environment. They believe creating good paying jobs through mineral extraction is harmful to the environment. They fail to comprehend that preservation of the environment and the creation of jobs are not mutually exclusive.

After decades of regulations, state and federal oversight, and scientific and technological advancements, extremist refuse to acknowledge that a win win scenario can be achieved. Based on the plan articulated by NMCC today, the Sierra County Commission believes NMCC's Mine exceeds every reasonable standard.

The commission implores you to make a reasonable decision, make the right decision for Sierra County and the State of New Mexico, and approve Copper Flat Mine's Groundwater Protection Discharge Permit.

Thank you for giving Sierra County the time and opportunity to support Copper Flat Mine.

Dear NM EID

Sept 24, 18

Comment by Taylor Streit

HC 31 Box 712

Caballo NM 87931

I like living on the frontier. But it has its drawbacks and when there aren't many people around bad things happen to the environment. Such was the case with the Moly Mine on the Red River in northern NM a couple decades ago. There was little opposition but myself and a handful of people--the Concerned Citizens of Questa--went to a lot of these meetings. But molybdian prices stayed high so our work didn't amount to much.

But that was a different time and if a mine was proposed near present day Taos—there wouldn't even be a meeting. Who cares what happens between Array, Hillsboro and Caballo? Those tiny towns are somewhere near the extremely remote Aldo Leopold Wilderness.

In the north I saw a relatively small mine turn into a huge beast that broke all the rules. I watched it devastate the lonely blue ribbon trout fishery of the lower Red River where I made my living. Not that the government didn't lay down the law. The Moly mine was fined what amounted to pocket change regularly.

When the operation pulled out it left a mess. Instead of doing the right thing and cleaning up the vast rubble, contaminated dirt and water, the mining companies fought the superfund process vehemently. And when our superfund committee was given a tour of reclaimed land we burst out laughing at a "reclaimed" slope we were taken to. There was two bushes growing out of a pile of smallish boulders!

We thought this was a joke, but the gal who was showing us around had such a hurt look on her face we realized she was getting well paid to visualize a garden.

The town of Questa's people had many health problems from exposure to heavy metals. These were ongoing problems because when the mine pulled out it left the town's water system bedded in tailings, the air full of nasty white dust in spring winds. The people—who were formally called miners-- all of a sudden were simply "the unemployed". Many were forced to move on from what was their historical homes. And there were lots of social and criminal problems too over the years. Like the 12 unsolved murders that had occurred over the mines tenure.

I have moved to this lonely place in southern NM and don't want to see the same thing happen here. At my tender age I am more interested in catfishing than "hike in" trout fishing. But if I get in shape its possible, because we have the southernmost Rio Grande Cutthroat trout fishery in the world. ((That's our state fish by the way.) the Animas aint much of stream; and it usually dries by the time it gets near the proposed mine wells, but it has a population of Rio Grande cutthroat trout above the Ladder on public land. But when that mammoth well starts a pumpin we can be sure that it will suck on the Animas aquafer so powerfully that it will dry it up even up even up into the Wilderness.

And then there is the downstream element too. Where me and my prized well and two peach trees are. Besides myself there are many other lifeforms: rare Arizona Sycamore, catfish, hatch green chili, pecans, waterfowls, cows, quail, deer, bighorn, farmers and even Texans.

I care what happens to all this life–don't you? But this "you" I speak of is just a few of us, and so we rely on the NM EID to do the right thing and not permit this mine.

This is my comment and I have included two photos from my book **Man vs Fish.** (From the story—Down on the Red.) The rare early photo is from 1980 and shows a clear Red River. The other—and later—

photo shows the blue/gray Red river of today. Which is now considered the standard water quality. As the story sadly points out, I unfortunately, remember a different, clear water Red River.

The clear water of the lower Red River, circa 1980. Photo by Mary Lou Polaski

Note the blue tint of the modern-day Red River.

the reel as fast as possible, giving the fish slack—the idea being that the current would carry the fly line below the ignorant creature, looping below the fish. Theoretically, when the line pulled from the other direction, the fish would lose track of the crafty angler and stop.

It seemed to work—the line went slack anyway—and either I had lost him or he was stopped. But I was on the wrong side of the log; and if our boy was still hooked, he was way downstream. Literally—around a bend I could see through the branches. Anything for such a fish! So I gulped some air, held my nose with one hand and the rod with the other, and under the log I dove. I bobbed back up to the surface and splashed on

Paul Tooley
916 Yucca Street
Truth or Consequences, NM 87901
(575) 740-1640

I was born, raised, and a lifelong resident of Sierra County. I served on the Truth or Consequences Municipal School Board for 16 years. I am currently on the Truth or Consequences Fire Department and have served for 32 years and currently hold the position of Fire Chief. I am employed by Sierra County as the Emergency Services Administrator. As a first responder I understand the need for safety regulations, inspections and education. I believe THEMAC Resource Group has done everything possible to meet the requirements of the New Mexico Environment Department Groundwater Quality Bureau. I support the position of the Copper Flat Mine Project and the issuing of their Groundwater Protection Discharge Permit.

HANS TOWNSEND. PRESIDENT of CHAMBER
DESERT VIEW INN 906 N. DATE

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have.
So why do so many throw their hands up in horror and try to tell us it will be the apocolypse for water, nature and life as these people know it if Copper Flat were to be allowed to proceed?
It really seems that some people think this is the first mine ever to come to Sierra County, when we've had mining here for many, many hundreds of years, and it's still a beautiful place to live.

It's time that our citizens realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community.
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting real opportunities to improve our economy slip away.
Many make the claim that the mine would take away water that we can't afford, but I don't hear the resistance to new pecan orchards that use multiple times more water per acreage, and don't have much economic impact for the citizens.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer in the way of employment, so most of our young people move away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and with no thought for the families that struggle to survive, living a long way below the poverty line. Many of these families have lived in Sierra County for generations.
I hear the claim that this is a retirement community, but that is an assumption that

is based on the present preponderence of older folks, not on the way the community was built.

This city was formed by workers, workers from the dam, workers who brought their families to live and grow here. We still have families, we still build schools for their children.

The reason for the abundance of older people is that we have a generation gap, a gap caused by the migration of young adults leaving to find a place where they can earn a better living. We don't just lose those young adults, we lose their children, and their childrens children, and it leaves a community with the too young to leave, and older adults who don't want or need to leave. Yes, retirees move in, but the percentage would be much smaller if we kept our young adults, and of course their children who would then grow up and restart the cycle.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.

That's partly because Sierra County is so very poor, among the poorest counties in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Baca, John, NMENV

From: Rebecca Walding <studio50@swcp.com>
Sent: Monday, September 24, 2018 12:09 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern,
I am appalled to think it is possible for New Mexico Copper to get a permit to dump ANY contaminated waste, let alone into or near New Mexico's water supply. This is a terrible idea with incredibly negative consequences that they are saying is likely to go into the groundwater.

Please, just say "No!"

Rebecca Walding
50 Main Street
Cerrillos, NM 87010
505-474-4931

Baca, John, NMENV

From: Swan Webb <swan.webb@gmail.com>
Sent: Monday, September 24, 2018 11:26 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The proposal to build a copper mine near Hillsboro is absolutely insane for a couple of reasons:

(1) Clean water is one of our most precious natural resources. The Rio Grande watershed is already diminished and and polluted. This would absolutely make the situation worse.

(2) New Mexico is currently being sued by Texas in the US Supreme Court over not delivering enough water to Texas in the Rio Grande. This water use would only make the situation worse.

(3) The Rio Grande Valley in general, and Hillsboro in particular, benefit greatly from outdoor activity, hunting, fishing and tourism. These long-term, sustainable and job creating industries are all threatened by this toxic mine.

Extractive and toxic industry is not the key to New Mexico's future. New Mexico Copper has no right to make life worse on millions of people by taking and polluting our water so they can make a few bucks. Please reject this reckless and dangerous proposal.

Thanks and regards,
Swan Webb
Downriver in Las Cruces

Baca, John, NMENV

From: Al Webster <awebster.sar@gmail.com>
Sent: Monday, September 24, 2018 11:10 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The ground water, and in fact, ***all*** water, is extremely important for both human and livestock consumption and for agricultural use here in New Mexico. If the water is not fit for those uses it is lost for human use.

The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water the supply even if it does not contaminate groundwater.

Please do not permit the Copper Flat Mine to have any such discharge permit.

Thanks,

Al

Al Webster
Lamy, NM
C: 505.901.2073

Baca, John, NMENV

From: Rob Wilson <gdoldrob@earthlink.net>
Sent: Monday, September 24, 2018 11:46 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

How can we even think of considering approval of this permit after the dry winter and summers we have experienced. Pumping or draining that much contaminate into our precious ground water is totally unthinkable. Don't let it happen. The Rio Grande is under enough pressure as it is; doing more damage to it is unfair to New Mexico and all others down stream.

Robert G. Wilson
Santa Fe

Baca, John, NMENV

From: Nolan Winkler <nolanwinkler@windstream.net>
Sent: Monday, September 24, 2018 1:04 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)
Attachments: hearing statement.docx

I hope to take my 3 minutes at Tuesday's hearing but if something happens I cannot, I am submitting my statement for the NM Environment Department.
Thanks so much,
M. Nolan Winkler (ms.)

In the matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

First I would like to read part of New Mexico's Constitution that I feel is important to granting this discharge permit.

Article 22, Section 21 of the Constitution of the State of New Mexico says, **"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."**

I would ask if leaving 700 vertical feet of steep pitfalls after mining 'protects' the state's beauty or health. This seems to benefit TheMac and NOT the people.

Second, I am confused about letting this Discharge Permit go through at this time as the Australian company that owns the mine has not yet secured enough water to allow it to function more than 1 1/2 or 2 months of a year. If they cannot secure more, that means their 11 years of working time would extend way into the future. My concern is, trying to learn from the history of like mining, would they even be in business so many years down the road. I would ask that this Discharge Permit not even be considered until the mine has secured enough water to function.

Third, I am told the Reclamation Bond of 54 million dollars the mine suggests has not been legally set and I again ask that the Discharge Permit not be considered until a Reclamation Bond is in place.

I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

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M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

September 17, 2018

My name is Steve Morgan. I am a Landscape Architect and I live in Kingston, NM.
I perform Living History performances as Aldo Leopold, considered by many as the most important conservationist of the 20th century because his ideas are so relevant to the environmental issues of our time. He is also referred to as the Father of the National Wilderness System, wrote the first book on Wildlife Management, established the science of ecological restoration and authored "The Sand County Almanac" in 1949, which stills inspires many to see the natural world as a community to which we belong.

I speak his words here:
We must quit this thinking about decent land use as solely an economic problem. Instead we should look at each problem in terms of what is ethically and aesthetically right, as well as economically expedient. For a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community.
It is wrong when it tends otherwise.

I strongly believe that if Aldo was aware of this current issue, he would say these words and also remind those involved that the total cost of this kind of economic destruction is never fully calculated. The amount of New Mexico water involved and the possibility of catastrophic flooding and the resulting environmental and economic destruction downstream should heavily outweigh the economic benefit to a foreign company.

I am opposed to granting the DISCHARGE PERMIT for the New Mexico Copper Company.

Thank you for accepting and considering my concerns and thoughts.
Sincerely,

Steve Morgan
Landscape Architect and Aldo Leopold Living History Performer
123 Kingston North St.
Hillsboro, NM 88042
(928) 830-9972

ADD: ETHICAL BEHAVIOR IS DOING THE RIGHT THING WHEN NO ONE ELSE IS WATCHING EVEN WHEN DOING THE WRONG THING IS LEGAL

I live on Animas Creek, and I encourage all of the hearing officers to take a drive up Animas Canyon to check out the magnificient Sycanmore trees - they are 350 to 450 years old - and see what is at stake here. This is not small potatoes -these are the redwoods of the southwest. If you make a decision - any decision- without seeing with your own eyes this incredible perennial riparian creek in New Mexico, then you are derelict in your duty to the people of New Mexico, and to seven generations that follow.

The pitlake and tailings pond that are at issue here are ten to fifteen miles upcreek from my home. The water production wells are even closer. We don't need an expert hydrologist to tell us that water flows downhill. I am assuming groundwater also flows in a similar manner. The last operator of this mine left in 1982. They left behind a tailings pond without a liner which as been leaking contamination into the groundwater for 35 years. Perhaps we have the cart before the horse here ... but I would think that an environment department of the State of New Mexico should perhaps be concerned that there is presently contamination leaking into the groundwater from the existing tailings pond before considering another permit by the same mine to do the same thing all over again!

And what about monitoring wells to monitor the plume of contamination that has already been contaminating the groundwater for 35 years? By NMED's own regulations, there should be interceptor wells in place to pump the contaminated groundwater back into the tailings pond. In order to do this, there would have to be sufficient water available in the interceptor wells, along with the water rights necessary to pump this water. There are no interceptor wells at present.

This mine has had nine owners in forty years, and has only been in operation a total of three months in forty years. DUuing these forty years, numerous letters of violation have been sent by the NMED, none of which have been responded to. There has been no bond set to insure that reclamation is adequate. As a private property owner, who will I seek redress from if the groundwater becomes polluted _ do you think I will be able to find anyone to answer the phone?

This is all just one big scam - a water grab, if you ask me. The promise of jobs and money flowing into Sierra County is minimal compared to the impact on not just Sierra County, but potentially the whole lower Rio Grande valley. Far more money is generated in the State of New Mexico from tourism than from mining - let's change our priorities. Our Land is more valuable than your money.

Catherine Berger
425 Animas Creek Road
Caballo NM 87931

I am against the Mine. The mine has hired experts to say "don't worry no leaking & no pollution can escape ~~thru~~ this man-made construction & remediation." The Cu Code = NM's $s to protect us. The NM department for environment thinks that the Cu Code which orders Mine pay for remediation & monitoring for (25) years after the Mine closes should be responsible for 100 years. The multi millionaires The Mine is in compliance with this. our INDUSTRY has A.U. happy. Our impoverished citizens in jobs 4 15 years of mine operation. Ag Mo & Cu making MASSIVE ~~huge~~ pile of pollution.

This Mine will operate for maybe 15 years. ~~Probably~~ maybe a Mine will pay for 100 years of monitoring & maintenance. This is a superfund that hopefully will be contained. This pollution will not go away. The pollution will be covered up.

This site won't be cleaned up but the pollution will be covered up. That = considered good enough.

Imagine the year 4018 — if all went well for a last (2) millennia that was built 2000 years ago that is still functioning as designed? Unfortunately a covered up pollution is intact. What do we know that is probably now uncovered & the pollution = relying on O_2, O, & H_2O shed

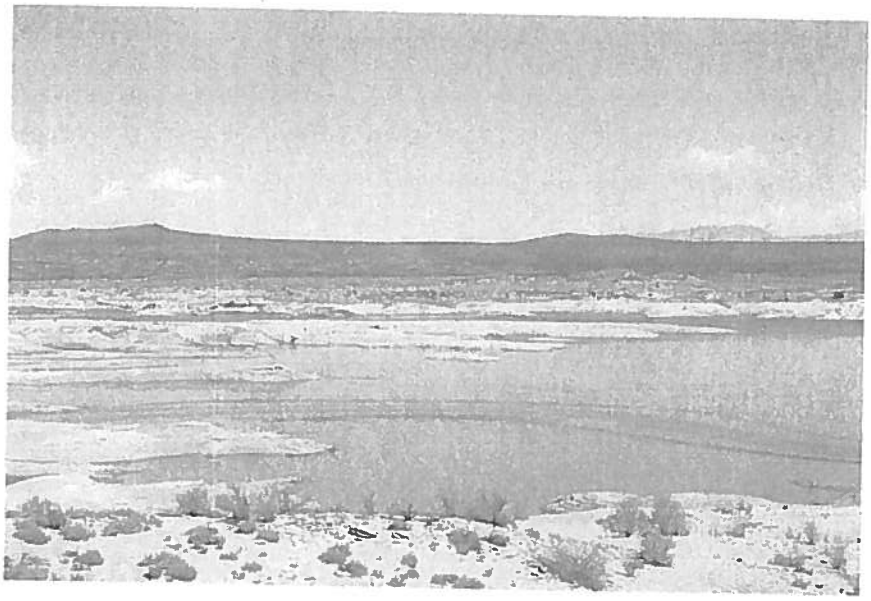
Martin Mijal 503-288-3710

ENVIRONMENT

11 hours ago

As warming strains NM's water supplies, 'status quo' no longer works

By **Laura Paskus**



Laura Paskus

Elephant Butte Reservoir on Sept. 10, 2018, at 3.7 percent capacity. It has since dropped down to 3.0 percent capacity, or less than 60,000 acre feet of water

On the downstream side of Elephant Butte Dam, U.S. Bureau of Reclamation employees navigate a stairwell above the Rio Grande, passing scat from the ring-tailed cats that like to hang out here, and enter through a door into the 300-foot tall concrete dam.

Built in the early twentieth century, Elephant Butte Dam holds back water stored for farmers in southern New Mexico, the state of Texas and Mexico. At full capacity, the reservoir is about 40 miles long and can retain more than 2,000,000 acre feet of water.

Jesse Higgins, an electrician who manages the powerplant at the dam, goes first and flips on the lights, which flicker and fire up after a few minutes. Labyrinthine tunnels burrow throughout, and water drains along the sides of the narrow, elevated path. Inside, it's easy to imagine what the world was like in 1916, when the dam was completed. The Civil War had been over for half a century—nearly comparable to the time between the Vietnam War and now—and the Mexican Revolution was ongoing. Since 1916, there have been world wars and shifting alliances, medical and technological breakthroughs. Humans have visited the moon and landed a rover on Mars. Our understanding of the Earth and humanity's impacts upon it have changed, as well.

But during that time, comparatively little has changed when it comes to how water is managed in New Mexico. The Rio Grande Compact, which divides water among Colorado, New Mexico and Texas was signed in 1938. And New Mexico's water laws today are still based on codes that the territorial legislature passed in 1907.

This story is the second in a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters.

But as the climate changes and warmer temperatures affect the state's rivers, reservoirs and aquifers, the same tactics and strategies that may have helped New Mexicans weather dry times over the past century won't keep working. And perhaps no place in the state offers such a stark reminder of that fact than the reservoir behind this dam. After a dry winter and hardly any snowmelt this spring, Elephant Butte Reservoir is at three percent capacity, storing 58,906 acre feet of water as of September 24 (https://waterdatafortexas.org/reservoirs/individual/elephant-butte).

"Historically, people tend to listen to what they want to hear, rather than what they need to hear: What they need to hear is that our laws do not reflect hydrology and our hydrology is changing for the worse, and if we do not manage it, it will manage itself," says Phil King, an expert on hydrology and the relationship between surface and ground water in southern New Mexico. "I would much rather correct the system ourselves through management than let nature do it's cold, hard reality fix," adds King, a professor of civil engineering at New Mexico State University and a consultant to the Elephant Butte Irrigation District, or EBID.

Stopping the 'death spiral'

EBID serves about 8,000 farmers in the Rincon and Mesilla valleys in southern New Mexico, from Arrey to the border town of Santa Teresa. If you've eaten chile from Hatch or pecans from Mesilla, fed alfalfa to your horses or poured milk from a New Mexico dairy into your coffee, you've consumed water that EBID's farmers divert from the Rio Grande and Elephant Butte or pump from the aquifer.

For roughly a century, EBID farmers have supplemented irrigation water with groundwater. Without it, they would not have survived the drought of the 1950s. But they pumped during the wet years, too, including throughout the 1980s and '90s. Then, beginning around 2003, about four years into the Southwest's current drought period, pumping ramped up even more.

That's a problem, especially in the Rio Grande Valley, where river water recharges the groundwater, and pumping water from the aquifer makes it even thirstier for river water.

With both the surface water and the groundwater strained, the system suffers a double-whammy, King says. That causes a positive feedback or what King calls a "death spiral."

Even though scientists, engineers, hydrologists and farmers know the two are intertwined within the same system, in New Mexico, groundwater and surface water are managed separately. King calls that "hydrological folly."

"We've got some major rethinking to do with New Mexico water law. Status quo is not an option," he says. "I think what people need to understand is we are facing conditions that mankind has not faced here before."

And the only way to reverse that death spiral is to use less water.

Laura Paskus

Chile fields in southern New Mexico

One way to do that, King says, is to formalize a fallowing system that allows cities, factories and businesses—in Las Cruces or in burgeoning border cities like Santa Teresa—to pump groundwater if they pay southern farmers with surface water rights to fallow their fields. Another way is for farmers to reduce their irrigated acreage and grow higher-value crops.

It's clear that any real solutions to cut water use must focus on agriculture. That's because farms use 75 percent of the water in the Rio Grande Basin. Cities can implement conservation measures, and people can reduce their household water use, King says, but the overall savings are minimal. Even finding "new" sources of water to add to the system—like capturing stormwater runoff or desalinating brackish water—will only add only tens of thousands of acre feet, King says. That doesn't come close to making up for the amount of water drought and climate change deplete from the system.

In King's ideal world, water management schemes would reflect the connection between surface and ground water. And water management wouldn't get blown off course by political winds. "I think the handling of water policy, in terms of both promulgation and implementation, needs to be de-politicized," he says. "It needs to be based much more on science, hydrology and the hydraulics of the system, rather than on politics."

Then, rather than each sector—agricultural, municipal and industrial—fighting over every last drop of water, solutions could emerge. And so, too, could changes that protect the river and groundwater system, the economy and people's futures.

'We're going to do everything we can'

At Elephant Butte, Reclamation runs the Rio Grande Project, delivering water each year to EBID, Texas and Mexico. The agency made it through this year, getting water to downstream users, even with record-low spring runoff. Elephant Butte, and other reservoirs, did their job, spokeswoman Mary Carlson has pointed out, (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) storing water from wetter years in the past. Meanwhile, the agency will continue refining its tools and technologies for modeling, forecasting and water delivery to figure out how to make it through next year, and the years after that.

"As you get stressed, you have to look for those outside-the-box ideas," says Yvette Roybal McKenna, with Reclamation's Water Management Division. "We have to find the optimum path so we can move forward and adapt." She says she can't accept a future where the project fails to deliver water. "We're going to do everything we can."

Reclamation has also been studying climate change and its effects on the Rio Grande Basin, which supplies drinking and irrigation water for more than six million people.

Between 1971 and 2001, average temperatures in the Upper Rio Grande Basin increased by an unprecedented 0.7 degree Fahrenheit per decade, or double the global average. And they're expected to rise within the basin by an additional four to six degrees Fahrenheit by the end of the 21st century.

Those rising temperatures will cut the amount of water flowing into the system, as well as the timing of those flows, according to a 2013 report from Reclamation about the impacts of climate change on the Upper Rio Grande Basin. At the same time, more water will evaporate from reservoirs. And plants—forests and crops—will demand more water to survive. All of these factors together, according to the report, "are expected to cause significant changes in the available water supply and demand."

A 2016 Reclamation report also notes that the rivers flows are already insufficient to meet the basin's water demands, and the basin already experiences water supply shortages, even without the effects of climate change.

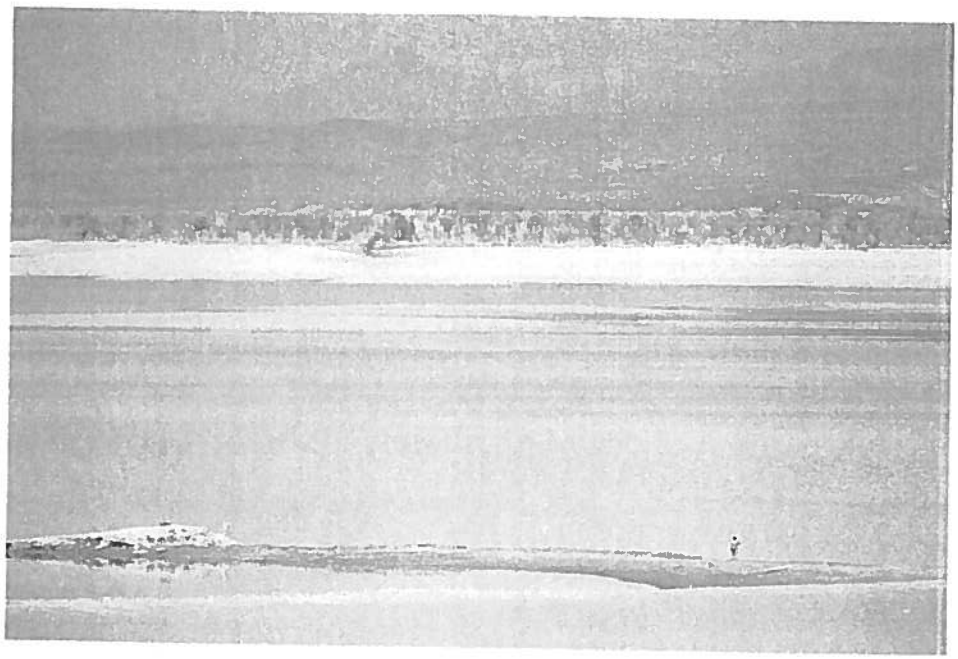
Elephant Butte is 'out of date'

One idea to keep more water in canals and pipes, as well as in the Rio Grande itself, is to stop storing water at Elephant Butte.

"Keeping water in Elephant Butte is a practice I think is out of date, and not wise," says Jen Pelz, an attorney for WildEarth Guardians. Located in southern New Mexico—an arid environment that keeps getting warmer—Elephant Butte Reservoir loses an enormous percentage of water each year to evaporation.

Rates of evaporation vary depending on humidity, wind, radiation, temperature and the amount of water actually in the lake. According to a 2004 report (https://nmwrri.nmsu.edu/wp-content/uploads/2015/research/rfp/studentgrants03/reports/herting.pdf) from New Mexico State University, evaporation from Elephant Butte can be up to one-third of the average inflow each year. Between 1940 and 1999, when inflows to the lake ranged from 114,100 acre feet to more than 2.8 million acre feet per year, annual evaporation averaged about 250,000 acre feet of water.

Warming will only accelerate Elephant Butte's evaporation rate—by another ten percent, according to Reclamation's 2016 report.



That means it's time to change where water is stored on the Rio Grande, says Pelz.

WildEarth Guardians wants the National Academies of Sciences to evaluate existing reservoirs in the basin and run models of how the system would function if water were stored in different places, such as in upstream reservoirs with lower evaporative losses.

Storing Rio Grande Project water—the water in Elephant Butte that Reclamation has to deliver to EBID, Texas and Mexico—in higher-altitude reservoirs would could save between 40,000 and 85,000 acre feet a year from evaporating, according a report from WildEarth Guardians called "Rethinking the Rio." (http://www.rethinkingtherio.org/executive_summary)

Changing where water is stored would mean renegotiating parts of the Rio Grande Compact of 1938. And since federal laws passed during the twentieth century lay out the rules for reservoir operations and water storage, Congress would need to take action.

"People have been talking about reservoir re-operation for a long time, but no one talks about how you do it," she says. "You have to deal with the compact, deal with the reservoir reauthorizations, deal with accountability along the river." If water were stored higher in the system, for example, downstream users would need to know their upstream neighbors weren't diverting their water unfairly.

Making these monumental changes demands building trust and relationships within the watershed, says Pelz. But New Mexico's vulnerability to climate change—revealed so clearly this year—should motivate everyone to start doing things differently.

"For the middle valley and in the south, [managers] delivered all the water for irrigation this year," Pelz says, "And if the reservoirs can't be filled up over the winter, there will be no water for next year."

That's a crisis, Pelz says, for the Rio Grande and for the people who depend upon it.

"Taking concrete steps to do something different means sacrifice: The reality in New Mexico is there are going to be sacrifices, areas that get dried up, and people have to change the way they make a living," she says. "That's the reality of the climate-changed world we live in."

This story is the second of a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters. Read Part 1 (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) ***here. You can also read all of our past coverage of the Rio Grande*** (http://nmpoliticalreport.com/tag/rio-grande/) ***and the Texas v. New Mexico & Colorado litigation*** (http://nmpoliticalreport.com/series/texas-v-new-mexico-scotus/).

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February 10, 2017
In "Environmental Project"

Comments

2 comments

Good Afternoon, I am Denise Barrera, General Manager of Sierra Electric Cooperative, Inc. headquartered in Elephant Butte New Mexico. Sierra Electric is a member owned rural electric cooperative serving over 3,150 (including City of T or C) members with 4,192 meters. We serve Sierra, Catron, Socorro and Luna counties. 99% of our meters are in Sierra County. We have about 900 miles of line with a density of 4.65, which is meters per mile.

Rural cooperatives have seven cooperative principles that they go by, one being "Concern for Community" – which is one of the highest concerns for SEC, including the economic needs of the members and residents of Sierra County. The NMCC will enhance and provide a unique opportunity for growth and sustainability to the Sierra County residents, surrounding counties and the state of New Mexico. It will offset the existing weak economic conditions our county is currently facing. It will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable critical services for its citizens.

In 1982 when Quintana Mine came on line for a short period, our purchases went from 18.2 million kwh in 1981 to 47.5 million. That is an increase of 29 million kwh. And that was for just a few months of operation.

The NMCC, with a 40MW load at 90% LF would increase our purchases from 65.4 million kwh to 263 million kwh. We are looking at approximately 197 million kwh per year. This would benefit the economic and financial conditions for our members of SEC by reducing the burden on our current rate payers, which 81% are residential. It would allow us to maintain and upgrade our system and infrastructure without having to increase rates or borrow funds and open up opportunities for additional economic development projects.

The SEC Board of Trustees adopted a board resolution in ~~January~~ FEBRUARY 2016 supporting NMCC for its investment and efforts in the development of the Copper Flats Mining Project in Sierra County. Over two years later, we continue to strongly support this unique opportunity for growth and sustainability to Sierra County and state economics.

On a more personal note – I have lived here practically my whole life. I graduated from HSHS. I started my career at SEC. I left in 1987 for a better job. The last 22 years of my 36 years in the electric cooperative business, I drove every day to Deming for work. While working in Deming, I never moved out of Sierra County. I have served on numerous boards and committees. One of which I served 12 years on the local school board. As a member of the School Board, I handed out hundreds of diplomas to graduating students knowing the majority of these kids were going to leave Sierra County for better career opportunities. And those who remain in Sierra County are faced with higher cost of living and lower wages. My son and his classmates graduated in 2004. My son is in Yuma, AZ, he has fellow classmates in Las Cruces, Albuquerque, Santa Fe, Dallas, Nashville. And this is just a few. I could go on for hours on what this mine would do for our community. But in closing, NMCC has demonstrated their commitment to Sierra County. They have already invested millions of dollars in this project. I ask that you please approve the Groundwater Protection Discharge Permit.

Thank you for giving us the opportunity to support NMCC and Copper Flat Mine.

#01-02-2016

BOARD RESOLUTION
Sierra Electric Cooperative, Inc.

A resolution supporting New Mexico Copper Corporation for its investment and efforts in the development of the Copper Flats Mining Project, located within the confines of Sierra County, which will enhance and provide a unique opportunity for growth and sustainability to the Sierra County and state economies.

WHEREAS, the Sierra Electric Cooperative is a Member owned, rural electric cooperative serving over 3,150 members with 4,142 meters in Sierra County and whose mission is "to provide the highest quality electric service, at the most affordable price, and in the safest manner" to our members; and

WHEREAS, the Sierra Electric Cooperative Board of Trustees "SEC Board" has reviewed the information developed under the management of the Las Cruces District Office of the Bureau of Land Management, Draft Environmental Impact Statement and finds it to be comprehensive, complete, and protective of environmental resources while providing economic opportunity for Sierra County and New Mexico, as presented; and

WHEREAS, the "SEC Board" recognizes the importance of regional economic development; and

WHEREAS, one of the Cooperative Principles that guides Sierra Electric is "Concern for Community" and the economic needs of the members of the Cooperative and the residents of our County are of the highest concern; and

WHEREAS, Sierra County is endowed with natural resources including copper which is an important industrial element used in infrastructure development, electrical power generation and transmission; and

WHEREAS, it is the desire of the SEC Board to promote the economic utilization of Sierra County's natural mineral resources in a responsible fashion that will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable important critical services for its citizens; and

WHEREAS, the economic base of Sierra County will be enhanced through the development of the Copper Flat Mine Project to help offset the existing weak economic conditions being experienced in Sierra County; and

WHEREAS, it is the desire of the SEC Board to support businesses that employ local citizens and utilize proven technologies that provide community safeguards and balance environmental stewardship with mineral and other natural resources production.

NOW THEREFORE, BE IT RESOLVED, that the SEC Board fully supports and encourages the granting of state and federal permits to the New Mexico Copper Corporation as needed to facilitate the opening and continuing operation of the Copper Flat Mine Project in Sierra County.

CERTIFICATE OF SECRETARY

I, O. L Wood, hereby certify that I am the Secretary of Sierra Electric Cooperative, Inc. and I further hereby certify that the above Resolution is a true and correct copy of the resolution passed and adopted by the Board of Trustees of Sierra Electric Cooperative, Inc., at its meeting held on February 19, 2016, at which meeting a quorum was present, and that this Resolution has not been rescinded or modified.

SIERRA ELECTRIC COOPERATIVE, INC. NO STOCKHOLDERS SEAL (SEAL) LIABILITY NEW MEXICO

O L Wood
O.L. Wood
Secretary

I get the impression that some people think this is the first mine in NM

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have. Nevertheless we are still here, and the area is still beautiful

It's time that our business community realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community?
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the baseless fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting opportunities to improve our economy slip away.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer so most of our young people moved away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all, they start with an outright lie and go on to embelish that lie.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and to be an anti hero.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.
That's partly because Sierra County is so very poor, one of the poorest in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Statement

My name is Robert Byrd, I am a retired engineer living in Las Cruces. My mother's family is from the old Hot Springs area, now T or C, my father worked in mining in New Mexico at Magdalena, and later Grants before moving out of state. I was afforded my own educational opportunities thanks in great part to my father's work in mining.

My concern is that opportunities for today's youth in southern New Mexico are seriously limited by the lack good-paying job opportunities that invest in their communities, which in turn affects the ability of communities to adequately fund education, and pay for infrastructure upkeep, a deadly cycle. Farming is important, but work is seasonal, and generally low paying. Government jobs are often good, but can be easily moved as political winds shift. New Mexico, with its low education rating isn't even close to the first choice for relocating high-tech industry. The Spaceport? Mañana- So why not mining? We have the resources- that other states don't have, we have institutional excellence at New Mexico Tech, and we have a willing workforce that needs high-paying jobs with a future.

I commend New Mexico Copper for their planned mine at Copper Flat. New Mexico has mineral resources that can, and should be developed in a sustainable fashion that are entirely compatible with other important economic activities- farming, tourism, manufacturing, as well as the high-tech fields.

The technical plan that New Mexico Copper has presented details how much water it will use, and how it will be managed. This isn't exotic, untried, or especially expensive technology- but it is modern, and represents the state of the art in an industry that deals with the same concerns across the world. I made some quick comparisons with the water that will be used in the Copper Flat operation, which is equivalent to the same amount of water consumed by a large pecan farm covering two sections of farmland. But the "social benefit" return on that water use in mining vastly dwarfs that in pecan farming- in terms of good paying jobs, local business rejuvenation, tax revenues and potentially follow-on support industries.

I strongly support approval of the necessary permits for the Copper Flat mine.

Statement for the City of Elephant Butte for the New Mexico Environment Department, Groundwater Protection Bureau

for the

Copper Flat Mine Project Groundwater Protection Discharge Permit

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The City of Elephant Butte became New Mexico's 101st incorporated community in July 1998, and is home of about 1,500 full time residents, and hosts as many as 100,000 on key summer holidays that visit New Mexico's largest lake, Elephant Butte Reservoir. In the City's 20 years of existence, we have striven to develop a friendly, safe and diverse community that is open to tourism and a comfortable retirement environment. – County's population overall is going down

20 years
FB MX comments surrounding states
Impact on our area??

As with much of New Mexico, particularly Sierra County and other rural New Mexico counties, maintaining a sustainable City infrastructure has been challenging since our inception, with poor economic conditions state-wide, and a lack of good paying, full-time jobs in Sierra County. With much of our county being Federally-owned, and other large private land holdings, the opportunities for economic development are constrained and challenging.

Need Industry

While we remain hopeful that Spaceport will someday soon develop and provide the economic stimulus that we have been waiting for since its official opening in 2011, this has not yet happened on a scale that has much effect on our economy.

In addition, the drought plaguing New Mexico over the past years, as well as political pressures to provide more and more water to the Mesilla Valley for increased agricultural acreages, as well as to the more water in the Rio Grande River system to the State of Texas and to Mexico, Elephant Butte Lake is currently only about 3% of its holding capacity. This has resulted in fewer visitations to Sierra County and Elephant Butte than virtually any year in our City's existence. This of course increases pressure on our local businesses, and we have seen some of them closing their doors.

While some opportunities can be developed in a variety of geographic locations, a Mineral Deposit must be developed where it occurs. You cannot relocate Ore Bodies.

The Copper Flat Mine Project offers a unique and valuable opportunity to the City of Elephant Butte, to Sierra County and to the State of New Mexico. The Copper Flat Project job opportunities are the kind that communities can build on. Currently, we lose many of our young, bright high school graduates, leaving our communities to education and job opportunities that are not available here. Copper Flat will provide nearly 300 full-time jobs, many of which will be entry level or well suited to many of our local skilled individuals that can operate heavy equipment, drive trucks, work as accountants, engineers, human resource specialists, Safety Professionals, Environmental Professionals, and many, many other opportunities.

These people will live in our communities, and spend their good paychecks on their daily family needs such as food, clothing, vehicles, gasoline and diesel, on an on. They will also pay Federal and State taxes; as well as contribute significantly to the Gross Receipts Taxes that our local municipal and county governments rely on to provide services to our communities.

Like a city or a county or even a state, when a major project is needed, it must be designed and built by qualified professionals. So too does a mining company like New Mexico Copper Corporation (NMCC). NMCC has engaged an impressive assemblage of Professional, Licensed and Experienced Engineers, Hydrologists, Metallurgist's, and others to develop the plans for the proposed facilities for the Copper

Flat Mine Project. Once approved for construction, there will be many opportunities for our local construction companies to play a role in the construction and development of the Copper Flat Mine Project.

Our city, our county and our state all need the Copper Flat Mine Project! The company has done its part, has professionally waded through the myriad of requirements, hired the best they can source to design the facilities so that they will be protective of the Environment during operations and well into the future.....something that was considered in the past. They will also post a significant Bond to assure that the operation and infrastructure is protective during operations and in the future.

We must seize this opportunity for our residents, our communities and for our future. What else to do we have to support our future? Our lake may never reach levels that it has in the past? Spaceport is a great opportunity, but when will it happen for Sierra County?

Without the Copper Flat Mine Project, our future and sustainability of our communities will be a difficult and challenging at best.

The City of Elephant Butte needs and supports the approval of the Groundwater Protection Discharge Permit for the Copper Flat Mine Project, and encourages the New Mexico Environment Department to complete their analysis and issue this permit as soon as possible!

Date 9/26/18

TO: HEARING CLERK
JOHN BACA
ON HEARING BEFORE THE SECRETARY OF ENVIRONMENT

DOCKET No. 8WB-18-06(P)

SUBJECT: IN THE MATTER OF DISCHARGE PERMIT #1840 FOR COPPER FLAT MINE

NAME: LARRY BROOKS desertlb@mac.com
LAS CRUCES & KINGSTON, NM

I AM A NATIVE NEW MEXICAN & LIFE LONG RESIDENT. WORKED IN NM MY WHOLE LIFE. SPENT 37 YEARS IN THE COATINGS INDUSTRY. I HAVE TRAVELED THE ALL OF THE STATE HIGHWAYS FROM JAL TO FARMINGTON CLOVERDALE TO DES MOINES, AND ALL POINTS INBETWEEN. I WORK PART TIME - TRAINING CONTRACTORS IN ROOF COATINGS & REPAIRS. ONE TYPE OF ROOF THAT WE CAN REPAIR IS "SINGLE PLY" (TPO, PVC, EPDM). IT'S SIMILAR TO THE LINING TO BE USED IN TO PROPOSED TAILING POND. THE SINGLE PLY ROOFS ARE USED ON LARGE ROOFS LIKE A WALMART. OFTEN WHEN A ROOF IS COMPLETED THERE WILL BE A FEW LEAKS ON THESE ENGINEERED SYSTEMS WITH PROFESSIONAL INSTALLATION. LEAKS CAN BE LOCATED & REPAIRED BUT CAN CAUSE A LOT OF DAMAGE & MAY HAVE GET MILDEW & BLACK MOLD. THE LEAK MAY

LOCATED & FIX. IF A LINER IS USED AS PROPOSED & FILLED & COVERED WITH THOUSANDS OF YARDS, TONS OF MINE TAILINGS & CRUSHED ROCK & WATER. SHARP ROCKS WOULD PUNCTURE THE LINING AND LEAK. MONITORING WELLS PROPOSED WOULD DETECT THE LEAK. SINGLE PLY SEAMS & PUNCTURES COULD BE REPAIRED. BUT HOW WITH TONS OF FILL & MILLIONS OF GALLONS OF WATER.

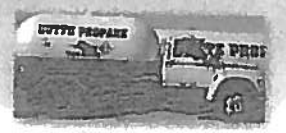
WE ARE TAKING WELL WATER & MAKING INDUSTRIAL WASTE & HOPING THE LINER DOES NOT LEAK. HOW CAN IT BE REPAIRED? REMEMBER THE LINER IS UNDER TONS OF TAILINGS AND MILLIONS OF GALLONS OF WATER WHICH ADDS HUGE AMOUNTS OF WEIGHT & PRESSURE. WHEN THIS LINER LEAKS WITH THE NEW INDUSTRIAL WASTE WATER, POLLUTED WATER, WHERE DOES IT GO?

I'm FOR JOBS IN THE AREA. HOWEVER, IF THE WATER IN GROUND IS POLLUTED WITH INDUSTRIAL HAZARDOUS WATER. IF WE POLLUTE THE AREA AROUND THE MINE. WHAT IS THE COST to WILDLIFE LIFE, PLANTS, HUMAN LIFE? WHAT WILL THE NEXT GENERATION HAVE IF THEIR IF WATER IS NOT FIT FOR DRINKING?

PLEASE DENY THIS DISCHARGE PERMIT.

= = WATER IS THE BLOOD OF LIFE

Larry Brooks



BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

Wednesday, September 26, 2018,

My name is Michael Skidmore. I am the owner of Butte Propane Company and I am here today to express my strong, unwavering and total support for the Copper Flat Mine.

Sierra County is my home. I moved here 35 years ago in 1983 from Oklahoma. At that time the copper mine was in full operation, providing good paying jobs for our county residents and much needed tax revenue for our state and local governments. Many other secondary businesses and jobs were also supported by the mine as they provided services and goods to the mine.

When the mine closed in 1985, the economic impact to the county was drastic! Jobs were lost, businesses closed and people moved away. Real Estate prices plummeted. The county experienced a depression it has never recovered from to this day.

What THEMAC Resources is asking is not a new mine in the sense that none has ever existed in our county before, but rather that we utilize the already existing resources that have been successfully mined in the past!

THEMAC has met or exceeded all mine safety and environmental codes and they own their own water. There is no valid reason to deny them the right to operate on land they own.

I see several obvious reasons the mine should be operating.

FIRST: The economic impact to our local community, and indeed, the state government in Santa Fe is obvious! Almost 400 full time, permanent, high paying jobs will generate much needed income for all! The taxes the mine will pay to the state, as well as the taxes paid by the employees will be substantial.

SECOND: Instead of a dying county with aging residents slowly reducing the population, our children can stay in Sierra County and infuse it with new vibrant energy and life.

THIRD: Those who oppose the copper mine are biting the very hand that feeds them! 90% of the automobiles we drive are made from mined metal ores, steel, aluminum, silver, copper, titanium, etc. Those who advocate for electric cars but oppose copper mining are opposing themselves! One can't have cars without

BUTTE PROPANE COMPANY, LLC

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EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

copper! Those who advocate for wind energy but oppose copper mining oppose themselves! Wind turbines need copper, where will the copper come from? A mine! Those who advocate for solar energy surely must realize that solar is impossible without copper!

Computers, cell phones, Televisions, cameras, video equipment, literally every field of technology is dependent on a secure, safe and continuing supply of copper! The demand for copper continues to escalate! In addition to the technical fields' dependency upon copper, our nation's power grid, electrical generating stations, power lines, electrical wiring for homes and businesses all need copper! Even my propane business needs copper for the regulators and tank tubing!

As new technology advances, the need for copper will only increase! It will not decrease!

When America is forced to import copper from other countries to supply the growing demand, not only is the cost increased, our national security is threatened. A country could simply cut off our copper supply and America would grind to a halt!

What good is a valuable natural resource if we are not allowed to use it?

Why not use a resource that is local, less expensive to mine, provides great paying jobs, much needed tax revenues and advance the technological age we live in?

Do everyone a favor and open the mine!

Madam Hearing Officer, I appreciate the opportunity to comment.

My name is Crystal Diamond, I am the director of Sierra Soil & Water Conservation District, a division of state government governed by a board of officials elected by all registered voters within their district boundaries, in our case Sierra County, Socorro County, Catron County, and parts of Dona Ana County.

By state statute, our district is charged with furthering the conservation, development, utilization, flood prevention and disposal of water, and thereby preserve and protect New Mexico's land and water resources.

Earlier in testimony, a representative from Turner Properties spoke of the protection and conservation measures implemented on the Ladder Ranch. The term *pristine water* was reference throughout. Ironically, it was our district and community landowners that seemed most concern for the water quality of Animas Creek when just 4 years ago, the ranch proposed the poisoning of our creek waters, including Rotenone, to kill out all fish inhabiting our steam in an effort to introduce the rio grande cutthroat trout. The poisonous waters would reach Caballo Lake, effectively killing fish species the ranch classified as undesirable, additionally, it was not disputed that protected species such as leopard frogs within the waters would be killed in the process. Impacts to irrigation and livestock waters were unknown, and the community push back was extreme. The project was abruptly halted when federal judges ruled the cutthroat trout did not warrant protected species designation. A ruling that pleased many within sierra county, specifically residents along Animas Creek, who were not pleased at the attempt made by their upstream neighbor to poison their water.

Our orders to promote sustainable conservation through multiple-use practices is a mission we take very seriously, therefor we were not quick to support the opening of Copper Flat mine without first being confident that our land, water, air and wildlife would not be negatively impacted.

Like the Ladder Ranch proposal, the conservation district was equally concerned about the impact Copper Flat proposal would have on our natural resources, specifically water quality. We have carefully reviewed the proposals and studies and called numerous meetings with copper flat representatives, including on-site visits. Our concerns and the concerns brought to us by the many farmers and ranchers we serve, have been thoroughly addressed and alleviated. We are confident that the mine has put in place measures of adequately protecting our waters and land.

It appears the effort to stop the opening of Copper Flat Mine, is not based on genuine concern for the environment. The opposition seems spearheaded in attempt to protect profits generated from an eco-tourism business that relies on "quiet open spaces and views". Sierra County welcomes this business. Just as we welcome the business opportunity of another- to use the land responsibly and wisely, generating profits for themselves while conserving the lands for future land steward.

This mining project has met what is required of them. We urge for their permitting to be granted. Together with the overwhelming majority of our citizens, Sierra SWCD stands in full support of Copper Flat Mine.

Madam chairwoman and all other interested parties in these proceedings, my name is TED CALLAWE live in Hillsboro NM. According their websites, Themac and NMCC are exploration and development corporations. It is my belief that it is their intent to sell the mine property, which is well within their rights. However, if that is their intent then there is no need for a discharge permit. If they want the permit as part of their development strategy and for marketability I believe that the law prohibits the government from enriching private entities with actions of its own doing. That is, the mine should be saleable as is, if not, then the permit is adding prohibited valuation. Further, if their intent is to actually operate the mine I would like to point out that neither company has any history or experience in operating a mine. As we all know, environmental damage is a probability with all mining operations. To allow inexperienced operations magnifies that potential to an unacceptable degree.

So, on these two points, non-governmental participation and inexperience, I ask that the discharge permit be denied. Thank you.

Ted Calaway

10634 Highway 152

Hillsboro NM 88042

Sierra Electric Cooperative, Inc.

610 Hwy 195 • P.O. Box 290 • Elephant Butte, New Mexico 87935
575-744-5231 • Fax: 575-744-5819
www.sierraelectric.org

Copper Flat Mine Groundwater Discharge Permit Hearing

Testimony of:
John Bokich
President, Board of Trustees
Sierra Electric Cooperative
PO Box 290
Elephant Butte, NM 87935

28 September 2018

- John Bokich, President of the Board of Trustees for Sierra Electric Cooperative
- My background includes:
  - Bachelor of Science and Master of Science degrees in Biological/Ecological Sciences from the University of Texas at El Paso
  - Certified Wildlife Biologist
  - Licensed Contractor in NM
  - Certified MSHA Safety Instructor
  - Certified Auditor, International Cyanide Management Institute
  - 36 years experience as an Environmental Professional in the Mining Industry
    - 8 awards for Excellence in Reclamation, including one in British Columbia and one in New Zealand. Six in New Mexico.

- Sierra Electric established in 1941, now in our 77th year of serving Sierra County
    - About 4,000 members
  - Challenges of an Electric Coop in Southern Rural New Mexico
    - Declining Membership with declining population in Sierra County
    - One of the poorest Counties in New Mexico with a stagnate to declining economy and little Industrial electrical load
    - Aging infrastructure with constant need for replacement and upgrading.
      - Nearly 900 miles of power lines (3 lines - ~3,000 miles of wire)
      - ~14,000 Wood Power Poles
      - Approximately 3,300 Transformers

        - Approximately 600 Regulators, Capacitors, Sectionalizing Devices, etc.
        - 2 Substations (Cuchillo (1977): 10 MVA / Caballo (2005): 5 MVA)
        - A fleet of specialized vehicles, equipment and Safety gear
    - Primarily a Residential Customer Base, the most difficult type of Base for sustaining infrastructure and service without continually needing to increase rates to Members
    - Difficulty finding skilled workers, rely on hiring bright locals and providing professional training and then trying to retain them
        - Problem with being in an economically challenged County is that we can't pay as much as other Coops with better economies.
- Electric Coop's, like mining operators, rely on professionals to design and construct our infrastructure
    - Sierra Electric has ongoing requirements to upgrade and replace our aging infrastructure as described above
    - For large Capital Projects, after they are Professionally designed, it goes to Bid, and is constructed by Licensed Professionals specialized in electrical projects.
    - Once construction complete, our own highly trained and specialized Linemen and Support Crews monitor and maintain the system, and conduct Maintenance and New small scale Construction Projects.
    - NMCC has done the same with design of their mine facilities, including the Tailings Storage Facility. It has been designed by **Professionals,** with extensive **Experience** in such operations and facilities. These Professionals rely on their designs and constructed facilities working to protect the environment in order to stay in business.....as will NMCC!
    - Sierra Electric Cooperative is a Working Example of how when good opportunity for good employment is available in Sierra County, that our local youth, and talented individuals who may be from other areas and like living in Small Town New Mexico, seek out these jobs, work through intensive and professional Training Programs, and improve themselves and build Careers in Sierra County.
    - This results in Growth to the County, which is what Sierra Electric needs to sustain and improve our service to our Members.

- We have heard a lot of talk this week, opinion, not fact, about the effects of mining on a community.
    - It is too bad that mining is such a rare industry in New Mexico these days. Mining is a wonderful and unique industry. It is much like a Family as how employees and families feel like member of a Team.
    - Mining folks work, live and share their lives with Workmates, and establish relationships that last a Lifetime.
    - Mining is an incredibly Complex, Technical and Potentially Dangerous industry.

- Mining has and continually upgrades a CULTURE OF SAFETY.
  - Like an Electric Cooperative…SAFETY IS NUMBER ONE!
  - Before you are hired, you will be required to take and pass a Drug and Alcohol Test, and Drug Tests will likely be given randomly through the year, or to any individual that has an accident on the mine that could have, or does result in injury to an employee or equipment. This is to protect our Workforce from someone who might come to or be at work in an impaired state.
  - A new employee will go through 24 hours (3 full workdays) of specific training by an MSHA Certified Instructor. All employees work together in these Training Classes…..Administration such as Receptionist, Accountants, Human Resources are in the same Safety Training Class with Haul-Truck Drivers, Bulldozer Operators, Mechanics and Mill Workers. You will receive full pay for any training that you take for Safety, or that is required by your job.
  - Every 12 months every employee must have an 8-hour Refresher Class to be Recertified to work at the mine.
  - SAFETY TRAINING, is not the end of your exposure to Safety at a mine. Every day before starting work, you will have a Safety Tailgate Meeting with your Crew to discuss the day's work plan, any special hazards or conditions that should be avoided or repaired, and more time and site-specific information to ensure that all employs are on the same page.
- In addition, Task Training will be required before anyone, even an experienced Operator, demonstrating that they know how to Safely operate a piece of Equipment.
- Task Training will also be continually offered to inexperienced employees so that they can learn Safe Operating Practices and be available for Promotion.

  - MSHA Safety Training, and the Safety Culture that will be practiced and required at the Copper Flat Mine will make you a Safer Person in all aspects of your life.
    - You will take home your Safety knowledge and culture and integrate it into you family life.
    - No-one in your family will ride in a moving vehicle, not even 50 feet, without buckling your seat belt.
    - You will be proveded PPE (Personal Protective Equipment), e.g. hard hat, reflective vest, hearing protection, eye protection, etc., by the Company. You will likely purchase your own steel-toed footwear.
    - You will teach your family the importance of using PPE around home for chores, and you will likely prepare and keep a kit in

your vehicles for emergencies.....blankets, water, food, tools, etc. You and your family will be prepared!

- As I said previously, a mine functions as a Team. Equipment Operators, Admin Staff, Mill Operators, Engineers, Environmental Dept., Safety Dept., etc., will all function together to operate the mine in a Safe and Planned way.
- The Mine Team will consist of:
  - Admin Staff..... Receptionist, Accountants, HR, etc.
  - Operations....Equipment Operators, Mill workers, Road and Infrastructure Maintenance, Blast Hole Drillers, Blasters, etc.
  - Operations Support....Environmental/Reclamation, Drainage Control, Mine Geology, Surveying, Grade Control, Warehouse, Equipment Maintenance (Heavy Equipment), Mill Maintenance, etc.
  - Management.....General Manager, Dept. Heads, etc.
- The Mine Team is made up of women, men, Hispanics, Blacks, Native Americans, Asian and any other persons legally able to work and live in Sierra County.

- I have been a land-owner in Sierra County, through my parents, since 1961, when they acquired a lot at Hot Springs Landing at Elephant Butte.
  - I was 10 years old when we "got out lot", and in the ensuing 57 years, I was a regular visitor to the area. In 2005, my wife and moved here full-time, and in 2016 I retired here.
  - I have seen many changes Sierra County since 1961, and few are positive. TorC was a thriving place, people were working, stores were open and diverse, things were happening.....good things, and our newspapers weren't full of photo's of people who had been arrested for drugs, murder, robbery, etc.
  - While Tourism is an important component of the future economy of Sierra County, it cannot carry the county on its own, as Sierra County's economy demonstrates.
    - Tourism jobs tend to be Seasonal, Temporary, with little to no Benefits, while Copper Flat jobs will be full-time with Benefits, Training and a future.
    - Tourism in Sierra County centers primarily around Elephant Butte Reservoir. Our lake level is currently about 3% full, as low as it has been in has been in about 50 years. A year ago the lake was about 12% full. With inflow in late 2017 and in 2018, the lake was reduced by 9%. If we don't have a large snowpack in 2018/2019, what is going to happen? Will the lake be at 1% full? Or 0% full. How is that going to affect Sierra County's tourist economy?
      - With ever increasing acreage of pecan trees being planted, a high water-use crop, and desert/riparian lands being converted to cropland, the issue of water with Texas and Mexico, will Elephant Butte ever again be a lake that is the engine of tourism in Sierra County?

- I spent 36 years working in the Mining Industry as an Environmental Manager at several mines in New Mexico, Nevada and Overseas.
    - One notable observation that I had in working at large mine sites over the years is that wildlife species are not driven away by mining, but attracted! Game that is hunted learns that a mine permit area is an area of protection as MSHA does not allow hunting/firearms on mine areas. In addition, many species learn that there are unique habitat opportunities on mine areas. I have noted Rock Wrens actively foraging for insect on recently blasted rock slopes, within minutes of a blast taking place. In addition, active mining areas as well as mine reclamation areas offer diversity to the habitat from surrounding areas, which draws in many species, short and long term.

- As an Environmental Professional in Mining, I have seen and been an Active Member of Mine Teams to plan and manage the construction, operation, environmental management, closure and reclamation of several large Tailings Storage Facilities, Heap Leach Pads and other mine facilities that have similar construction objectives and used the same techniques and materials as those proposed for the Copper Flat Mine.
- I also managed an Environmental Auditing program for a Gold Company, and conducted Environmental Audits on gold mines in the US, Canada, Chile, Brazil, Zimbabwe and Russia.
    - Many of these mines were aged, and yet the tailings facilities and systems were designed, built and operated to rigorous standards, and were protective of the environment.
    - I have never known of a project that I was involved with, that was designed, constructed and operated, as is proposed at Copper Flat, to have failed.
    - The Copper Flat Mine Project has been designed with the most advanced and proven technologies known today, and will use the most advanced and proven materials to protect the environment while providing jobs, training and opportunity to our local youth and working people, and economic stimulus to Sierra County.

- The design, construction and operation of the Quintana Mine in the late 1970's and early 1980's was in a totally different era of mine and facility design, and consideration of the environment, and our science has advanced significantly since that time.
    - When Quintana constructed the Tailings Storage Facility, it only had a clay-type liner and little else to prevent migration of fluids and tailings constituents into groundwater.
    - The result was a relatively small plume of water that did percolate from the TSF into the groundwater below and downgradient of the TSF.
    - I have reviewed data taken from monitoring wells that intersect this plume.
    - While the groundwater samples from the monitoring wells does have some elevated values for some constituents, primarily TDS and Sulfate, the values are not really very high, and there were no samples that showed copper as being above Standards!

- In contrast, in a report published by NM Tech in 2013, samples taken of water discharged from the TorC Hot Springs District, directly into the Rio Grande River at a rate of about 1 million gallons per day show some sulfate and TDS concentrations well above Human Health Standards.
- In addition, thousands of tons of ammonium sulfate fertilizer is applied to the crops in the Mesilla Valley, which borders the Rio Grande River south of the Copper Flat Project.
    - A paper in the publication Chemical Geology in 2011, which studied sulfate levels in the Mesilla Valley, concludes that fertilizers containing sulfate were major contributors to elevated sulfate in groundwater, down to depths of as much as 600 feet.
- Also, water samples reported by the US Geologic Survey in 1998 for the years 1992-95, showed elevated levels of many pesticides and volatile organic compounds and nutrients, which were detected in surface and ground waters of the Rio Grande Valley. With the significant increase of croplands since 1995, what are those values today?

- I find it hypocritical that there is criticism of Copper Flat potentially affecting groundwater quality....historically shown to be sulfate and TDS, when there is residue of nitrogen (nitrates) and sulfate that leaches into the groundwater of the Mesilla Valley in much greater quantities.
- In addition, there has been criticism of the design of the TSF and the materials to be used, HDPE in particular. HDPE is used extensively to protect groundwater and the environment. Hazardous Waste Landfills, gold mines containing solutions containing cyanide, and many others utilize this material. HDPE is estimated to last 500+ years. In this application, where there is a compacted sub-base and the HDPE liner is protected from excess pressures by the solution drainage system and from UV light by the covering of tailings, it could well last in perpetuity.
    - And who is to say that the Elephant Butte Dam, which is already 100 years old, is going to last 500+ years, or if it is, that the lake won't be virtually full of sediment with little or no water storage capacity? Without the Elephant Butte Dam, agriculture in the Mesilla Valley will be a remnant of the past.

- NMCC has followed the path that federal and state regulation require, they have engaged highly trained, experienced and professional teams to design a comprehensive project that will protect the environment, generate much needed opportunity and economic benefits to Sierra County, and reclaim the land to a condition better than what it is today.

IT IS TIME TO APPROVE THIS PROJECT AND LET THOSE IN SIERRA COUNTY THAT WANT TO WORK, THAT WANT TO SEE THEIR CHILDREN STAY IN SIERRA COUNTY AND WORK, AND WANT A COUNTY THAT IS ECONOMICALLY SUSTAINABLE, RECEIVE WHAT CAN BE HAD IF THE PORJECT IS APPROVED.

New Mexico Copper Corporation Copper Flat Discharge Permit DP 1840.

My name is Linda Seebach, I live in Hillsboro, NM.

I am opposed to this permit being approved for the following reasons:

I hold a Bachelor of Arts Degree in Social Science from New Mexico Institute Of Mining and Technology (now New Mexico Tech), a Master's Degree In Social Work from the University of Denver, I am a former (now retired) Certified Floodplain Manager (CFM) in New Mexico and also a former NPDES Administrator for the Village of Los Ranchos de Albuquerque NM and therefore am in a unique position to address the proposed Copper Flat Mine ground water discharge permit before you.

I would first like to address the socio economic position of Sierra County. It is true that Sierra County needs jobs and economic income. However, historically, Copper Flat Mine had not been economically viable. Bankruptcy, near bankruptcy, abandonment until sold has been its history. THEMAC and NMCC, who have never operated a mine, would have you believe this is going to change, they have all the answers and history would not repeat itself. This is a projection, not a guarantee.They need $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 12 straight years of over $3.00 /lb. prices.

Secondly, THEMAC and NMCC have put forth hydrological information in a dogmatic position, "This is what is and how it will remain for the next 100 years". They have not addressed the hydrological changes which WILL occur by pumping 7000 + acre feet per year from the aquifer in addition to current usage. Depleting the aquifer by that amount yearly will cause a change in the hydrology of the area. Over a twelve year period, this will be significant.

In their presentation NMCC mentioned briefly a seismology report was required by the OSE, Dam Division, however, there has not been, to my knowledge, a comprehensive study of the effects of the shock waves from blasting over the twelve year production projection and the redistribution of 112 million tons of material within ¼ mile of the Las Animas fault. It is reasonable to question whether the combined mining activities of blasting, machinery vibration, and redistribution of 112 million tons of material would cause fractures in the Las Animas fault and what the results of that fracturing would be.

HDPE liners are considered, for several reasons, always to leak a little (they are specifically said by manufactures to be "water resistant" not "water proof"). The under-drain collecting system

(which normally would be under a top liner to catch the expected leakage) is located above the liner. It is not, in fact, an "under-drain" system, but they still call it that. It is an "above drain" system which functions to capture water directly from the tailings to be reused. Nothing prevents contaminated water that gets past the liner (mostly through accidental punctures, rips, etc. – they have to drive equipment over the liner to install it) from going into the ground and thus into groundwater. This violates the NM Water Quality Act, but the NM Supreme Court sanctioned this violation by saying the Copper Rule's solution to this problem is valid. That solution is to say that if the groundwater is polluted by the tailings pond, that pollution has to be detected by the monitoring wells placed around the TSF, and then the situation is remedied by a network of "interceptor wells" that pump the contaminated groundwater back into the tailings pond thus not letting any pollution downstream. That is why the proposed TSF has neither a real under-drain collection system nor even a leakage detection system.

To respond to these points: a) since NMED knows definitively that the existing tailing pond (which has no plastic liner) is leaking contamination into groundwater and has been for 35 years, NMED should require an interceptor system to operate from the beginning of operations, i.e., it should be in place and not wait until new contamination is detected by the new monitoring wells; b) NMED must verify that NMCC owns enough water rights to operate a sufficient interceptor system; if they don't then the permit should not be issued; c) the location of the so called "under-drain" system does not satisfy the Copper Rule requirement for a tailing pond which specifies a "tailing seepage collection system" [NMAC 20.6.7.22A(4)(d)(v)] because it does not catch the seepage going past the liner into the ground. The Copper Rule itself defines "seepage" as leachates that get into the vadose zone, which is the moist layer of soil above groundwater. The requirement is for under-drain systems.

As a result of climate change, New Mexico has experienced a higher incident of 500 year storm events in the last ten years, two of which have been in the Hillsboro area. In calculating the storm water management portion of the permit, they have devised a "ledge" which would separate NMCC property from BLM property within the proposed pitlake area. In the NM Water Quality Act (NM Statutes Annotated 74-6-1) there is a provision called Limitations (NMSA 74-6-12C) which exempts water that is entirely on private property, that does not combine with other waters, and whose effects are confined to that property. NMCC started resurveyed the land around the pit to show they own all of the pit. However, there is a small portion of BLM land which sticks into the projected future pitlake at the end of operations. The level of the pitlake is going to change according to storm events. The ledge is planned to be three feet above the proposed water level, it will overtop the ledge during a 500 year storm event, as three feet does not allow sufficient freeboard for a 500 year event.

They have not addressed the probability of a 500 year storm which would impact the holding pits of the mine, thus causing the overflow of contaminates into the Greyback Arroyo and on to the Ladder and Hillsboro Pitchfork Ranches. Should the contaminated pits overflow in such a manner, the mine becomes a point source contamination to the Rio Grande River.

In summary, I protest this permit on the grounds of insufficient studies into the above mentioned areas of concern. THEMAC and NMCC are asking you to believe "This is what is, and it will continue to be so". NO it will not continue to be so…there are many variables in the equation that have not been adequately addressed. They are saying, "This is what will continue to be". No, they need to have contingency plans and more detailed analytical studies, instead of their dogma.

Sincerely,

Linda Seebach

Linda Seebach

10634 Hiway 152

Hillsboro, NM 88042

FREEPORT-MCMORAN

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

Baca, John, NMENV

From: Stan Brodsky <stanandrob@windstream.net>
Sent: Friday, September 07, 2018 11:59 AM
To: Baca, John, NMENV
Subject: Copper Flat Mine Re-opening

I am all for adding several hundred jobs to Sierra County, but the price for doing that seems pretty high. I'm talking mainly about water usage. We are in a draught. Wells are going dry in Hillsboro. The mine has said they need to use about 16-17 acre-feet of water per day, which is over 5 million gallons per day. An average family used less than 1 acre-foot per YEAR.

I am also concerned about pollution of the ground water from contaminated water flowing out of the mine operation. As you know, there will be a hearing on the mine's projected water discharge om 9/24 – 9/25. We'll see what NMCC and Themac have to say at that time.

And then there are a couple of less important, but still important, things. One would be damage to the road on route 152 from the very heavy trucks, and then there is also the question of added traffic to route 152 (trucks and workers). As you probably know, Rt. 152 is a 2 lane road, one lane each way, with no shoulders.

Stan Brodsky

Date 9/26/18

TO: HEARING CLERK
JOHN BACA
ON HEARING BEFORE THE SECRETARY OF ENVIRONMENT

DOCKET No. 8WB-18-06(P)

SUBJECT: IN THE MATTER OF DISCHARGE PERMIT #1840 FOR COPPER FLAT MINE

NAME: LARRY BROOKS desertlb@mac.com
LAS CRUCES & KINGSTON, NM

I AM A NATIVE NEW MEXICAN & LIFE LONG RESIDENT. WORKED IN NM MY WHOLE LIFE. SPENT 37 YEARS IN THE COATINGS INDUSTRY. I HAVE TRAVELED THE ALL OF THE STATE HIGHWAYS FROM JAL TO FARMINGTON CLOVERDALE TO DES MOINES, AND ALL POINTS INBETWEEN. I WORK PART TIME - TRAINING CONTRACTORS IN ROOF COATINGS & REPAIRS. ONE TYPE OF ROOF THAT WE CAN REPAIR IS "SINGLE PLY" (TPO, PVC, EPDM). IT'S SIMILAR TO THE LINING TO BE USED IN TO PROPOSED TAILING POND. THE SINGLE PLY ROOFS ARE USED ON LARGE ROOFS LIKE A WALMART. OFTEN WHEN A ROOF IS COMPLETED THERE WILL BE A FEW LEAKS ON THESE ENGINEERED SYSTEMS WITH PROFESSIONAL INSTALLATION. LEAKS CAN BE LOCATED & REPAIRED BUT CAN CAUSE A LOT OF DAMAGE & MAY HAVE GET MILDEW & BLACK MOLD. THE LEAK MAY

LOCATED & FIX. IF A LINER IS USED AS PROPOSED & FILLED & COVERED WITH THOUSANDS OF YARDS, TONS OF MINE TAILINGS & CRUSHED ROCK & WATER. SHARP ROCKS WOULD PUNCTURE THE LINING AND LEAK. MONITORING WELLS PROPOSED WOULD DETECT THE LEAK. SINGLE PLY SEAMS & PUNCTURES COULD BE REPAIRED. BUT HOW WITH TONS OF FILL & MILLIONS OF GALLONS OF WATER.

WE ARE TAKING WELL WATER & MAKING INDUSTRIAL WASTE & HOPING THE LINER DOES NOT LEAK. HOW CAN IT BE REPAIRED? REMEMBER THE LINER IS UNDER TONS OF TAILINGS AND MILLIONS OF GALLONS OF WATER WHICH ADDS HUGE AMOUNTS OF WEIGHT & PRESSURE. WHEN THIS LINER LEAKS WITH THE NEW INDUSTRIAL WASTE WATER, POLLUTED WATER, WHERE DOES IT GO?

I'm FOR JOBS IN THE AREA. HOWEVER, IF THE WATER IN GROUND IS POLLUTED WITH INDUSTRIAL HAZARDOUS WATER. IF WE POLLUTE THE AREA AROUND THE MINE. WHAT IS THE COST to WILDLIFE LIFE, PLANTS, HUMAN LIFE? WHAT WILL THE NEXT GENERATION HAVE IF THEIR IF WATER IS NOT FIT FOR DRINKING?

PLEASE DENY THIS DISCHARGE PERMIT.

= WATER IS THE BLOOD OF LIFE.

Larry Brooks

BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

Wednesday, September 26, 2018,

My name is Michael Skidmore. I am the owner of Butte Propane Company and I am here today to express my strong, unwavering and total support for the Copper Flat Mine.

Sierra County is my home. I moved here 35 years ago in 1983 from Oklahoma. At that time the copper mine was in full operation, providing good paying jobs for our county residents and much needed tax revenue for our state and local governments. Many other secondary businesses and jobs were also supported by the mine as they provided services and goods to the mine.

When the mine closed in 1985, the economic impact to the county was drastic! Jobs were lost, businesses closed and people moved away. Real Estate prices plummeted. The county experienced a depression it has never recovered from to this day.

What THEMAC Resources is asking is not a new mine in the sense that none has ever existed in our county before, but rather that we utilize the already existing resources that have been successfully mined in the past!

THEMAC has met or exceeded all mine safety and environmental codes and they own their own water. There is no valid reason to deny them the right to operate on land they own.

I see several obvious reasons the mine should be operating.

FIRST: The economic impact to our local community, and indeed, the state government in Santa Fe is obvious! Almost 400 full time, permanent, high paying jobs will generate much needed income for all! The taxes the mine will pay to the state, as well as the taxes paid by the employees will be substantial.

SECOND: Instead of a dying county with aging residents slowly reducing the population, our children can stay in Sierra County and infuse it with new vibrant energy and life.

THIRD: Those who oppose the copper mine are biting the very hand that feeds them! 90% of the automobiles we drive are made from mined metal ores, steel, aluminum, silver, copper, titanium, etc. Those who advocate for electric cars but oppose copper mining are opposing themselves! One can't have cars without

BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

copper! Those who advocate for wind energy but oppose copper mining oppose themselves! Wind turbines need copper, where will the copper come from? A mine! Those who advocate for solar energy surely must realize that solar is impossible without copper!

Computers, cell phones, Televisions, cameras, video equipment, literally every field of technology is dependent on a secure, safe and continuing supply of copper! The demand for copper continues to escalate! In addition to the technical fields' dependency upon copper, our nation's power grid, electrical generating stations, power lines, electrical wiring for homes and businesses all need copper! Even my propane business needs copper for the regulators and tank tubing!

As new technology advances, the need for copper will only increase! It will not decrease!

When America is forced to import copper from other countries to supply the growing demand, not only is the cost increased, our national security is threatened. A country could simply cut off our copper supply and America would grind to a halt!

What good is a valuable natural resource if we are not allowed to use it?

Why not use a resource that is local, less expensive to mine, provides great paying jobs, much needed tax revenues and advance the technological age we live in?

Do everyone a favor and open the mine!

Madam Hearing Officer, I appreciate the opportunity to comment.

My name is Crystal Diamond, I am the director of Sierra Soil & Water Conservation District, a division of state government governed by a board of officials elected by all registered voters within their district boundaries, in our case Sierra County, Socorro County, Catron County, and parts of Dona Ana County.

By state statute, our district is charged with furthering the conservation, development, utilization, flood prevention and disposal of water, and thereby preserve and protect New Mexico's land and water resources.

Earlier in testimony, a representative from Turner Properties spoke of the protection and conservation measures implemented on the Ladder Ranch. The term *pristine water* was reference throughout. Ironically, it was our district and community landowners that seemed most concern for the water quality of Animas Creek when just 4 years ago, the ranch proposed the poisoning of our creek waters, including Rotenone, to kill out all fish inhabiting our steam in an effort to introduce the rio grande cutthroat trout. The poisonous waters would reach Caballo Lake, effectively killing fish species the ranch classified as undesirable, additionally, it was not disputed that protected species such as leopard frogs within the waters would be killed in the process. Impacts to irrigation and livestock waters were unknown, and the community push back was extreme. The project was abruptly halted when federal judges ruled the cutthroat trout did not warrant protected species designation. A ruling that pleased many within sierra county, specifically residents along Animas Creek, who were not pleased at the attempt made by their upstream neighbor to poison their water.

Our orders to promote sustainable conservation through multiple-use practices is a mission we take very seriously, therefor we were not quick to support the opening of Copper Flat mine without first being confident that our land, water, air and wildlife would not be negatively impacted.

Like the Ladder Ranch proposal, the conservation district was equally concerned about the impact Copper Flat proposal would have on our natural resources, specifically water quality. We have carefully reviewed the proposals and studies and called numerous meetings with copper flat representatives, including on-site visits. Our concerns and the concerns brought to us by the many farmers and ranchers we serve, have been thoroughly addressed and alleviated. We are confident that the mine has put in place measures of adequately protecting our waters and land.

It appears the effort to stop the opening of Copper Flat Mine, is not based on genuine concern for the environment. The opposition seems spearheaded in attempt to protect profits generated from an eco-tourism business that relies on "quiet open spaces and views". Sierra County welcomes this business. Just as we welcome the business opportunity of another- to use the land responsibly and wisely, generating profits for themselves while conserving the lands for future land steward.

This mining project has met what is required of them. We urge for their permitting to be granted. Together with the overwhelming majority of our citizens, Sierra SWCD stands in full support of Copper Flat Mine.

Madam chairwoman and all other interested parties in these proceedings, my name is TED CALLAWAY I live in Hillsboro NM. According their websites, Themac and NMCC are exploration and development corporations. It is my belief that it is their intent to sell the mine property, which is well within their rights. However, if that is their intent then there is no need for a discharge permit. If they want the permit as part of their development strategy and for marketability I believe that the law prohibits the government from enriching private entities with actions of its own doing. That is, the mine should be saleable as is, if not, then the permit is adding prohibited valuation. Further, if their intent is to actually operate the mine I would like to point out that neither company has any history or experience in operating a mine. As we all know, environmental damage is a probability with all mining operations. To allow inexperienced operations magnifies that potential to an unacceptable degree.

So, on these two points, non-governmental participation and inexperience, I ask that the discharge permit be denied. Thank you.

Ted Calaway

10634 Highway 152

Hillsboro NM 88042

Sierra Electric Cooperative, Inc.

610 Hwy 195 • P.O. Box 290 • Elephant Butte, New Mexico 87935
575-744-5231 • Fax: 575-744-5819
www.sierraelectric.org

Copper Flat Mine Groundwater Discharge Permit Hearing

Testimony of:
John Bokich
President, Board of Trustees
Sierra Electric Cooperative
PO Box 290
Elephant Butte, NM 87935

28 September 2018

- John Bokich, President of the Board of Trustees for Sierra Electric Cooperative
- My background includes:
  - Bachelor of Science and Master of Science degrees in Biological/Ecological Sciences from the University of Texas at El Paso
  - Certified Wildlife Biologist
  - Licensed Contractor in NM
  - Certified MSHA Safety Instructor
  - Certified Auditor, International Cyanide Management Institute
  - 36 years experience as an Environmental Professional in the Mining Industry
    - 8 awards for Excellence in Reclamation, including one in British Columbia and one in New Zealand. Six in New Mexico.

- Sierra Electric established in 1941, now in our 77th year of serving Sierra County
    - About 4,000 members
  - Challenges of an Electric Coop in Southern Rural New Mexico
    - Declining Membership with declining population in Sierra County
    - One of the poorest Counties in New Mexico with a stagnate to declining economy and little Industrial electrical load
    - Aging infrastructure with constant need for replacement and upgrading.
      - Nearly 900 miles of power lines (3 lines - ~3,000 miles of wire)
      - ~14,000 Wood Power Poles
      - Approximately 3,300 Transformers

        - Approximately 600 Regulators, Capacitors, Sectionalizing Devices, etc.
        - 2 Substations (Cuchillo (1977): 10 MVA / Caballo (2005): 5 MVA)
        - A fleet of specialized vehicles, equipment and Safety gear
    - Primarily a Residential Customer Base, the most difficult type of Base for sustaining infrastructure and service without continually needing to increase rates to Members
    - Difficulty finding skilled workers, rely on hiring bright locals and providing professional training and then trying to retain them
        - Problem with being in an economically challenged County is that we can't pay as much as other Coops with better economies.
- Electric Coop's, like mining operators, rely on professionals to design and construct our infrastructure
    - Sierra Electric has ongoing requirements to upgrade and replace our aging infrastructure as described above
    - For large Capital Projects, after they are Professionally designed, it goes to Bid, and is constructed by Licensed Professionals specialized in electrical projects.
    - Once construction complete, our own highly trained and specialized Linemen and Support Crews monitor and maintain the system, and conduct Maintenance and New small scale Construction Projects.
    - NMCC has done the same with design of their mine facilities, including the Tailings Storage Facility. It has been designed by **Professionals,** with extensive **Experience** in such operations and facilities. These Professionals rely on their designs and constructed facilities working to protect the environment in order to stay in business…..as will NMCC!
    - Sierra Electric Cooperative is a Working Example of how when good opportunity for good employment is available in Sierra County, that our local youth, and talented individuals who may be from other areas and like living in Small Town New Mexico, seek out these jobs, work through intensive and professional Training Programs, and improve themselves and build Careers in Sierra County.
    - This results in Growth to the County, which is what Sierra Electric needs to sustain and improve our service to our Members.

- We have heard a lot of talk this week, opinion, not fact, about the effects of mining on a community.
    - It is too bad that mining is such a rare industry in New Mexico these days. Mining is a wonderful and unique industry. It is much like a Family as how employees and families feel like member of a Team.
    - Mining folks work, live and share their lives with Workmates, and establish relationships that last a Lifetime.
    - Mining is an incredibly Complex, Technical and Potentially Dangerous industry.

- Mining has and continually upgrades a CULTURE OF SAFETY.
  - Like an Electric Cooperative…SAFETY IS NUMBER ONE!
  - Before you are hired, you will be required to take and pass a Drug and Alcohol Test, and Drug Tests will likely be given randomly through the year, or to any individual that has an accident on the mine that could have, or does result in injury to an employee or equipment. This is to protect our Workforce from someone who might come to or be at work in an impaired state.
  - A new employee will go through 24 hours (3 full workdays) of specific training by an MSHA Certified Instructor. All employees work together in these Training Classes…..Administration such as Receptionist, Accountants, Human Resources are in the same Safety Training Class with Haul-Truck Drivers, Bulldozer Operators, Mechanics and Mill Workers. You will receive full pay for any training that you take for Safety, or that is required by your job.
  - Every 12 months every employee must have an 8-hour Refresher Class to be Recertified to work at the mine.
  - SAFETY TRAINING, is not the end of your exposure to Safety at a mine. Every day before starting work, you will have a Safety Tailgate Meeting with your Crew to discuss the day's work plan, any special hazards or conditions that should be avoided or repaired, and more time and site-specific information to ensure that all employs are on the same page.
- In addition, Task Training will be required before anyone, even an experienced Operator, demonstrating that they know how to Safely operate a piece of Equipment.
- Task Training will also be continually offered to inexperienced employees so that they can learn Safe Operating Practices and be available for Promotion.

  - MSHA Safety Training, and the Safety Culture that will be practiced and required at the Copper Flat Mine will make you a Safer Person in all aspects of your life.
    - You will take home your Safety knowledge and culture and integrate it into you family life.
    - No-one in your family will ride in a moving vehicle, not even 50 feet, without buckling your seat belt.
    - You will be proveded PPE (Personal Protective Equipment), e.g. hard hat, reflective vest, hearing protection, eye protection, etc., by the Company. You will likely purchase your own steel-toed footwear.
    - You will teach your family the importance of using PPE around home for chores, and you will likely prepare and keep a kit in

your vehicles for emergencies.....blankets, water, food, tools, etc. You and your family will be prepared!

- As I said previously, a mine functions as a Team. Equipment Operators, Admin Staff, Mill Operators, Engineers, Environmental Dept., Safety Dept., etc., will all function together to operate the mine in a Safe and Planned way.
- The Mine Team will consist of:
  - Admin Staff..... Receptionist, Accountants, HR, etc.
  - Operations....Equipment Operators, Mill workers, Road and Infrastructure Maintenance, Blast Hole Drillers, Blasters, etc.
  - Operations Support....Environmental/Reclamation, Drainage Control, Mine Geology, Surveying, Grade Control, Warehouse, Equipment Maintenance (Heavy Equipment), Mill Maintenance, etc.
  - Management.....General Manager, Dept. Heads, etc.
- The Mine Team is made up of women, men, Hispanics, Blacks, Native Americans, Asian and any other persons legally able to work and live in Sierra County.

- I have been a land-owner in Sierra County, through my parents, since 1961, when they acquired a lot at Hot Springs Landing at Elephant Butte.
  - I was 10 years old when we "got out lot", and in the ensuing 57 years, I was a regular visitor to the area. In 2005, my wife and moved here full-time, and in 2016 I retired here.
  - I have seen many changes Sierra County since 1961, and few are positive. TorC was a thriving place, people were working, stores were open and diverse, things were happening.....good things, and our newspapers weren't full of photo's of people who had been arrested for drugs, murder, robbery, etc.
  - While Tourism is an important component of the future economy of Sierra County, it cannot carry the county on its own, as Sierra County's economy demonstrates.
    - Tourism jobs tend to be Seasonal, Temporary, with little to no Benefits, while Copper Flat jobs will be full-time with Benefits, Training and a future.
    - Tourism in Sierra County centers primarily around Elephant Butte Reservoir. Our lake level is currently about 3% full, as low as it has been in has been in about 50 years. A year ago the lake was about 12% full. With inflow in late 2017 and in 2018, the lake was reduced by 9%. If we don't have a large snowpack in 2018/2019, what is going to happen? Will the lake be at 1% full? Or 0% full. How is that going to affect Sierra County's tourist economy?
      - With ever increasing acreage of pecan trees being planted, a high water-use crop, and desert/riparian lands being converted to cropland, the issue of water with Texas and Mexico, will Elephant Butte ever again be a lake that is the engine of tourism in Sierra County?

- I spent 36 years working in the Mining Industry as an Environmental Manager at several mines in New Mexico, Nevada and Overseas.
    - One notable observation that I had in working at large mine sites over the years is that wildlife species are not driven away by mining, but attracted! Game that is hunted learns that a mine permit area is an area of protection as MSHA does not allow hunting/firearms on mine areas. In addition, many species learn that there are unique habitat opportunities on mine areas. I have noted Rock Wrens actively foraging for insect on recently blasted rock slopes, within minutes of a blast taking place. In addition, active mining areas as well as mine reclamation areas offer diversity to the habitat from surrounding areas, which draws in many species, short and long term.

- As an Environmental Professional in Mining, I have seen and been an Active Member of Mine Teams to plan and manage the construction, operation, environmental management, closure and reclamation of several large Tailings Storage Facilities, Heap Leach Pads and other mine facilities that have similar construction objectives and used the same techniques and materials as those proposed for the Copper Flat Mine.
- I also managed an Environmental Auditing program for a Gold Company, and conducted Environmental Audits on gold mines in the US, Canada, Chile, Brazil, Zimbabwe and Russia.
    - Many of these mines were aged, and yet the tailings facilities and systems were designed, built and operated to rigorous standards, and were protective of the environment.
    - I have never known of a project that I was involved with, that was designed, constructed and operated, as is proposed at Copper Flat, to have failed.
    - The Copper Flat Mine Project has been designed with the most advanced and proven technologies known today, and will use the most advanced and proven materials to protect the environment while providing jobs, training and opportunity to our local youth and working people, and economic stimulus to Sierra County.

- The design, construction and operation of the Quintana Mine in the late 1970's and early 1980's was in a totally different era of mine and facility design, and consideration of the environment, and our science has advanced significantly since that time.
    - When Quintana constructed the Tailings Storage Facility, it only had a clay-type liner and little else to prevent migration of fluids and tailings constituents into groundwater.
    - The result was a relatively small plume of water that did percolate from the TSF into the groundwater below and downgradient of the TSF.
    - I have reviewed data taken from monitoring wells that intersect this plume.
    - While the groundwater samples from the monitoring wells does have some elevated values for some constituents, primarily TDS and Sulfate, the values are not really very high, and there were no samples that showed copper as being above Standards!

- In contrast, in a report published by NM Tech in 2013, samples taken of water discharged from the TorC Hot Springs District, directly into the Rio Grande River at a rate of about 1 million gallons per day show some sulfate and TDS concentrations well above Human Health Standards.
- In addition, thousands of tons of ammonium sulfate fertilizer is applied to the crops in the Mesilla Valley, which borders the Rio Grande River south of the Copper Flat Project.
    - A paper in the publication Chemical Geology in 2011, which studied sulfate levels in the Mesilla Valley, concludes that fertilizers containing sulfate were major contributors to elevated sulfate in groundwater, down to depths of as much as 600 feet.
- Also, water samples reported by the US Geologic Survey in 1998 for the years 1992-95, showed elevated levels of many pesticides and volatile organic compounds and nutrients, which were detected in surface and ground waters of the Rio Grande Valley. With the significant increase of croplands since 1995, what are those values today?

- I find it hypocritical that there is criticism of Copper Flat potentially affecting groundwater quality....historically shown to be sulfate and TDS, when there is residue of nitrogen (nitrates) and sulfate that leaches into the groundwater of the Mesilla Valley in much greater quantities.
- In addition, there has been criticism of the design of the TSF and the materials to be used, HDPE in particular. HDPE is used extensively to protect groundwater and the environment. Hazardous Waste Landfills, gold mines containing solutions containing cyanide, and many others utilize this material. HDPE is estimated to last 500+ years. In this application, where there is a compacted sub-base and the HDPE liner is protected from excess pressures by the solution drainage system and from UV light by the covering of tailings, it could well last in perpetuity.
    - And who is to say that the Elephant Butte Dam, which is already 100 years old, is going to last 500+ years, or if it is, that the lake won't be virtually full of sediment with little or no water storage capacity? Without the Elephant Butte Dam, agriculture in the Mesilla Valley will be a remnant of the past.

- NMCC has followed the path that federal and state regulation require, they have engaged highly trained, experienced and professional teams to design a comprehensive project that will protect the environment, generate much needed opportunity and economic benefits to Sierra County, and reclaim the land to a condition better than what it is today.

IT IS TIME TO APPROVE THIS PROJECT AND LET THOSE IN SIERRA COUNTY THAT WANT TO WORK, THAT WANT TO SEE THEIR CHILDREN STAY IN SIERRA COUNTY AND WORK, AND WANT A COUNTY THAT IS ECONOMICALLY SUSTAINABLE, RECEIVE WHAT CAN BE HAD IF THE PORJECT IS APPROVED.

New Mexico Copper Corporation Copper Flat Discharge Permit DP 1840.

My name is Linda Seebach, I live in Hillsboro, NM.

I am opposed to this permit being approved for the following reasons:

I hold a Bachelor of Arts Degree in Social Science from New Mexico Institute Of Mining and Technology (now New Mexico Tech), a Master's Degree In Social Work from the University of Denver, I am a former (now retired) Certified Floodplain Manager (CFM) in New Mexico and also a former NPDES Administrator for the Village of Los Ranchos de Albuquerque NM and therefore am in a unique position to address the proposed Copper Flat Mine ground water discharge permit before you.

I would first like to address the socio economic position of Sierra County. It is true that Sierra County needs jobs and economic income. However, historically, Copper Flat Mine had not been economically viable. Bankruptcy, near bankruptcy, abandonment until sold has been its history. THEMAC and NMCC, who have never operated a mine, would have you believe this is going to change, they have all the answers and history would not repeat itself. This is a projection, not a guarantee.They need $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 12 straight years of over $3.00 /lb. prices.

Secondly, THEMAC and NMCC have put forth hydrological information in a dogmatic position, "This is what is and how it will remain for the next 100 years". They have not addressed the hydrological changes which WILL occur by pumping 7000 + acre feet per year from the aquifer in addition to current usage. Depleting the aquifer by that amount yearly will cause a change in the hydrology of the area. Over a twelve year period, this will be significant.

In their presentation NMCC mentioned briefly a seismology report was required by the OSE, Dam Division, however, there has not been, to my knowledge, a comprehensive study of the effects of the shock waves from blasting over the twelve year production projection and the redistribution of 112 million tons of material within ¼ mile of the Las Animas fault. It is reasonable to question whether the combined mining activities of blasting, machinery vibration, and redistribution of 112 million tons of material would cause fractures in the Las Animas fault and what the results of that fracturing would be.

HDPE liners are considered, for several reasons, always to leak a little (they are specifically said by manufactures to be "water resistant" not "water proof"). The under-drain collecting system

(which normally would be under a top liner to catch the expected leakage) is located above the liner. It is not, in fact, an "under-drain" system, but they still call it that. It is an "above drain" system which functions to capture water directly from the tailings to be reused. Nothing prevents contaminated water that gets past the liner (mostly through accidental punctures, rips, etc. – they have to drive equipment over the liner to install it) from going into the ground and thus into groundwater. This violates the NM Water Quality Act, but the NM Supreme Court sanctioned this violation by saying the Copper Rule's solution to this problem is valid. That solution is to say that if the groundwater is polluted by the tailings pond, that pollution has to be detected by the monitoring wells placed around the TSF, and then the situation is remedied by a network of "interceptor wells" that pump the contaminated groundwater back into the tailings pond thus not letting any pollution downstream. That is why the proposed TSF has neither a real under-drain collection system nor even a leakage detection system.

To respond to these points: a) since NMED knows definitively that the existing tailing pond (which has no plastic liner) is leaking contamination into groundwater and has been for 35 years, NMED should require an interceptor system to operate from the beginning of operations, i.e., it should be in place and not wait until new contamination is detected by the new monitoring wells; b) NMED must verify that NMCC owns enough water rights to operate a sufficient interceptor system; if they don't then the permit should not be issued; c) the location of the so called "under-drain" system does not satisfy the Copper Rule requirement for a tailing pond which specifies a "tailing seepage collection system" [NMAC 20.6.7.22A(4)(d)(v)] because it does not catch the seepage going past the liner into the ground. The Copper Rule itself defines "seepage" as leachates that get into the vadose zone, which is the moist layer of soil above groundwater. The requirement is for <u>under-drain</u> systems.

As a result of climate change, New Mexico has experienced a higher incident of 500 year storm events in the last ten years, two of which have been in the Hillsboro area. In calculating the storm water management portion of the permit, they have devised a "ledge" which would separate NMCC property from BLM property within the proposed pitlake area. In the NM Water Quality Act (NM Statutes Annotated 74-6-1) there is a provision called Limitations (NMSA 74-6-12C) which exempts water that is entirely on private property, that does not combine with other waters, and whose effects are confined to that property. NMCC started resurveyed the land around the pit to show they own all of the pit. However, there is a small portion of BLM land which sticks into the projected future pitlake at the end of operations. The level of the pitlake is going to change according to storm events. The ledge is planned to be three feet above the proposed water level, it will overtop the ledge during a 500 year storm event, as three feet does not allow sufficient freeboard for a 500 year event.

They have not addressed the probability of a 500 year storm which would impact the holding pits of the mine, thus causing the overflow of contaminates into the Greyback Arroyo and on to the Ladder and Hillsboro Pitchfork Ranches. Should the contaminated pits overflow in such a manner, the mine becomes a point source contamination to the Rio Grande River.

In summary, I protest this permit on the grounds of insufficient studies into the above mentioned areas of concern. THEMAC and NMCC are asking you to believe "This is what is, and it will continue to be so". NO it will not continue to be so…there are many variables in the equation that have not been adequately addressed. They are saying, "This is what will continue to be". No, they need to have contingency plans and more detailed analytical studies, instead of their dogma.

Sincerely,

Linda Seebach

Linda Seebach

10634 Hiway 152

Hillsboro, NM 88042

FREEPORT-MCMORAN

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

Baca, John, NMENV

From: Stan Brodsky <stanandrob@windstream.net>
Sent: Friday, September 07, 2018 11:59 AM
To: Baca, John, NMENV
Subject: Copper Flat Mine Re-opening

I am all for adding several hundred jobs to Sierra County, but the price for doing that seems pretty high. I'm talking mainly about water usage. We are in a draught. Wells are going dry in Hillsboro. The mine has said they need to use about 16-17 acre-feet of water per day, which is over 5 million gallons per day. An average family used less than 1 acre-foot per YEAR.

I am also concerned about pollution of the ground water from contaminated water flowing out of the mine operation. As you know, there will be a hearing on the mine's projected water discharge om 9/24 – 9/25. We'll see what NMCC and Themac have to say at that time.

And then there are a couple of less important, but still important, things. One would be damage to the road on route 152 from the very heavy trucks, and then there is also the question of added traffic to route 152 (trucks and workers). As you probably know, Rt. 152 is a 2 lane road, one lane each way, with no shoulders.

Stan Brodsky

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

September 24, 2018

Via Electronic Mail
John.baca2@state.nm.us
and Federal Express

Mr. John Baca
Hearings Clerk
New Mexico Environment Department
P.O. Box 5469
1190 South St. Francis Drive
Santa Fe, New Mexico 87502

Re: Discharge Permit (DP-1840) Hearing for Copper Flat Mine

Dear Mr. Baca:

This letter responds to the Notice of Public Hearing for Copper Flat Mine (the "Notice") regarding the hearing scheduled by the New Mexico Environment Department ("NMED") for September 24, 2018 through September 28, 2018 in Truth or Consequences, New Mexico, on the proposed groundwater discharge permit ("Discharge Permit or DP-1840) prepared by the NMED in response to a permit application ("Application") submitted by New Mexico Copper Company ("NMCC") for the Copper Flat Mine in Sierra County, New Mexico (the "Mine").

Texas strongly objects to the Mine and the issuance of the Discharge Permit by NMED. The Application and Notice states that the Mine will discharge over 25 million gallons per day of polluted liquid wastewater (over 100 billion gallons over the life of the Mine) from mill tailings, process water, impacted stormwater and domestic water ("Tailings"). The Application also proposes the discharge of other impacted stormwater, process water, and leachate generated from the Mine's operations in other areas.

As reflected in the attached picture, the Mine is located next to arroyos and natural stream beds that flow directly into the Caballo Reservoir. In its various applications for the Mine, NMCC admits that

the Mine's operations are hydrologically connected to the Rio Grande and Caballo Reservoir. Although NMCC claims that the Tailings will be stored in synthetically lined tailing ponds, there is no assurance that these ponds will not leak, overflow and fail. An example is the recent Animus River spill disaster in Colorado. Approval of the Discharge Permit for the Mine with the location of the Tailings ponds upstream and in close proximity to the Caballo Reservoir is not prudent from an environmental standpoint.

Millions of people in Southern New Mexico and Texas rely on water in the Rio Grande and Caballo Reservoir. A spill of Tailings would contaminate water in the Rio Grande and Caballo Reservoir and would be devastating to Southern New Mexico and Texas. The potential for this kind of disaster outweighs the economic benefits of the Mine.

New Mexico is a party to the Rio Grande Compact of 1938 with Texas and Colorado (the "Compact"). The Compact requires that New Mexico deliver a certain quality and quality of water to Texas. The water in the Rio Grande and Caballo Reservoir below Elephant Butte Reservoir belongs to Texas and is used for delivery to its contract users. The Mine and Discharge Permit will have a substantial and long-term adverse effect on Texas' water in the Rio Grande and Caballo Reservoir. If allowed, these actions violate Texas's rights under the Compact. Texas is currently in litigation against New Mexico in the United States Supreme Court, see Texas v. New Mexico, Original No. 141, regarding Compact violations. Granting the Discharge Permit and allowing the Mine to operate will add to these violations and Texas's damages against New Mexico under the Compact.

Attached are copies of written comments from Texas.

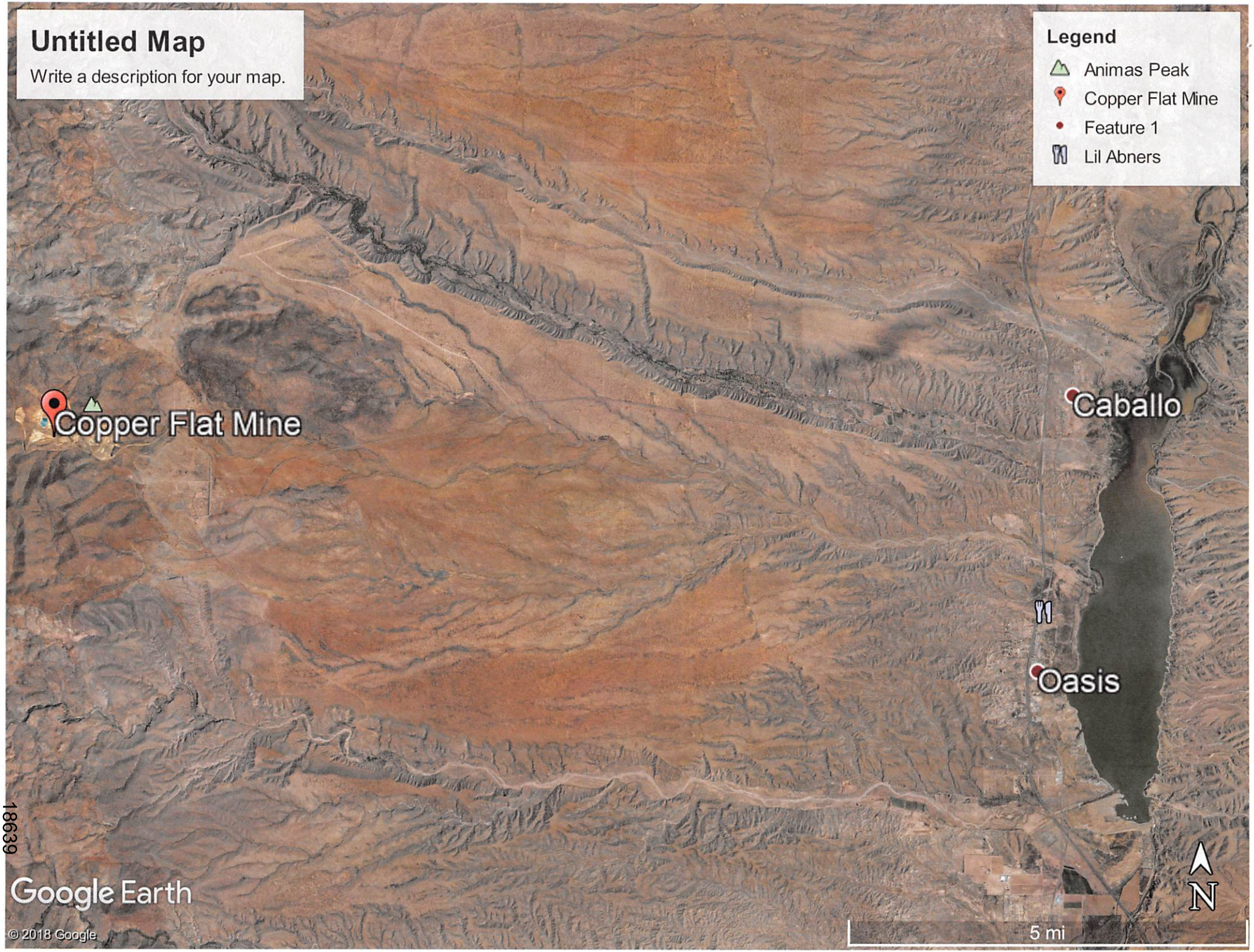
Sincerely,

Pat Gordon

Pat Gordon
Texas Rio Grande Compact Commissioner

cc: Andrew Knight, Esq.
General Counsel, NMED
P.O. Box 5469
1190 South St. Francis Drive
Santa Fe, New Mexico 87502-5469
Andrew.knight@state.nm.us

Mr. Brad Reid
NMED Ground Water Quality Bureau
P.O. Box 5469
1190 St. Francis Drive
Santa Fe, New Mexico 87502-5469
Brad.reid@state.nm.us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Legend
Animas Peak
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NOTICE OF PUBLIC HEARING
NEW MEXICO ENVIRONMENT DEPARTMENT

The New Mexico Environment Department (NMED) will hold a public hearing beginning at 9:00 a.m. on September 24, 2018, and proceed through September 28, 2018 as necessary, at the Ralph Edwards Auditorium in Truth or Consequences, New Mexico. In the event the hearing is not completed by September 28, the hearing will continue beginning October 9, 2018 and proceed through October 12, 2018 as necessary. The hearing will consider a proposed groundwater discharge permit (Discharge Permit or DP-1840) prepared by NMED in response to a permit application submitted by New Mexico Copper Corporation (NMCC or Applicant) for discharges from the proposed Copper Flat Mine (Facility). The Hearing Officer will provide opportunities for general oral statements or non-technical testimony from members of the public throughout the hearing at breaks in the presentation of technical testimony, and in a public comment session beginning at 5:00 p.m. on September 25, 2018 and continuing as long as there is comment to be given. A Spanish-language interpreter will be available at the hearing.

Name of the Applicant: New Mexico Copper Corporation

Location of the Discharge: The facility is located at 85 Copper Rock Road approximately 5 miles NE of Hillsboro, in Sections 30 and 31, T15S, R06W, Sections 25, 26, 35, and 36, T15S, R07W, and Section 6, T16S, R06W, Sierra County.

Activities Which Produce the Discharge: NMCC is proposing to construct and operate an open pit copper mine and associated mineral processing facilities. Regulated mine units will include an open pit, waste rock stockpiles, ore stockpiles, mineral processing units including a mill and concentrator, process water impoundments, and a synthetically lined tailing impoundment.

Quality, Quantity, and Flow Characteristics of the Discharge: The Applicant proposes to discharge a maximum of 25,264,000 gallons per day (gpd) of mill tailings, process water, impacted stormwater, and domestic wastewater to a synthetically lined tailing impoundment. In addition, discharge of impacted stormwater, process water, and leachate generated from waste rock stockpiles, mine units including a concentrator and associated mineral processing facilities, impoundments, sumps, tanks, and pipelines, and other areas within the permit area would be authorized pursuant to DP-1840.

The Copper Flat Open Pit walls, the waste rock stockpiles, the Tailings Storage Facility and other impacted areas at the mine facility may contain sulfide minerals which, when oxidized, generate acidic solutions. These acidic solutions react with in situ minerals to produce acid rock drainage (ARD) that typically contains total dissolved solids (TDS), sulfate and certain metals in concentrations that exceed the water quality standards of Section 20.6.2.3103 NMAC. Process water and impacted stormwater discharges from the Copper Flat Mine, including ARD, are typically outside the acceptable range for pH and contain TDS, sulfate and certain metals in concentrations that exceed the water quality standards of Section 20.6.2.3103 NMAC.

Depth to Groundwater: Ground water beneath the proposed Copper Flat Mine is at a depth of approximately 7 to 156 feet with a pre-discharge TDS concentration of approximately 317 to 868 milligrams per liter.

Hearing Procedures: The hearing will be conducted pursuant to the NMED Permit Procedures regulations, 20.1.4 NMAC, and the NMED Ground and Surface Water Protection regulations, 20.6.2.3110 NMAC. Any member of the public may attend the hearing and present relevant non-technical testimony, orally or in writing, and examine witnesses testifying at the hearing. To be a party or to present technical testimony, a person must follow the procedures below:

Entry of Appearance Required to be a Party: Any person who wishes to be a party shall file with the Hearing Clerk, and serve upon all other parties of record, including NMED and the Applicants, an *Entry of Appearance* on or before **August 24, 2018**.

Statement of Intent to Present Technical Testimony Required: Any person who wishes to present technical evidence, data, or testimony at the hearing shall file with the Hearing Clerk and serve on the Applicants, NMED, and all other parties of record a *Statement of Intent to Present Technical Testimony* on or before **August 24, 2018**, pursuant to 20.6.2.3110.C NMAC. A timely filed Statement of Intent shall be considered an Entry of Appearance. The Statement of Intent must comply with the requirements in 20.1.4.300 NMAC and 20.6.2.3110.C NMAC and shall include: (1) the name of the person filing the statement; (2) a statement as to whether the person supports or opposes the proposed permit; (3) the name, address, affiliation, work background, and educational background of each witness; (4) the estimated length of direct testimony of each witness; (5) a list of exhibits to be offered into evidence at the hearing with a copy of each exhibit that is not already part of the Record Proper; (6) a list of all technical materials, including information where the material can be obtained, relied upon by each witness in making a technical statement of fact or opinion and an explanation of the basis for such an opinion; and (7) the full written direct testimony of each witness including any opinions to be offered by such witness and an explanation of the basis for that opinion.

Failure to file a timely Entry of Appearance or Statement of Intent to Present Technical Testimony shall preclude a person from being a party to the proceeding and from presenting technical testimony, but shall not preclude a person from presenting a general written or oral statement or non-technical testimony in the proceeding.

Final Determination on Permit by NMED: The Secretary of NMED will make a final determination approving, conditionally approving, or disapproving DP-1840 based on the administrative record for the permit application, public comment, and the public hearing.

Documents Filed with Hearing Clerk: All documents that need to be filed with the Hearing Clerk shall be submitted to: John Baca, Hearing Clerk, NMED, P.O. Box 5469, 1190 St. Francis Drive, Santa Fe, New Mexico 87502, (505) 827-2430.

Documents Served on NMED: All documents that need to be served on NMED shall be sent to: Andrew Knight, NMED Office of General Counsel, 1190 South St. Francis Drive, P.O. Box 5469, Santa Fe, New Mexico, 87502-5469, or andrew.knight@state.nm.us.

Further Information and NMED Contact: For further information on DP-1840 and the public hearing, or to be placed on the facility-specific mailing list, please contact Brad Reid, NMED Ground Water Quality Bureau (GWQB), 1190 St. Francis Drive, P.O. Box 5469, Santa Fe, New Mexico 87502-5469, at (505) 827-2963, or at brad.reid@state.nm.us. The administrative record and the proposed permit can be viewed at the GWQB, and on the NMED website at https://www.env.nm.gov/gwqb/mecs/.

If any person requires assistance, an interpreter, or auxiliary aid to participate in this process, please contact John Baca at (505) 827-2430, or submit a written request to Mr. Baca, at least ten (10) calendar days prior to the hearing at NMED, P.O. Box 5469, Santa Fe, New Mexico 87502-5469, or john.baca2@state.nm.us.

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, you may contact: Kristine Pintado, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above.

Transcripts of Hearing. Pursuant to 20.6.2.3110.J NMAC, NMED will make an audio recording of the hearing. If any person requests a written transcript or certified copy of the audio recording, the requestor shall pay the cost of the transcription or audio copying.

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

May 17, 2018

Via Electronic Delivery

Mr. Doug Haywood, Project Lead
BLM Las Cruces District Office
1800 Marquess Street
Las Cruces, New Mexico 88005

RE: Comments of the Draft Environmental Impact Statement from the Bureau of Land Management ("BLM") for the Copper Flat Copper Mine

Notice of violation of the Rio Grande Compact

Dear Mr. Haywood:

As the Texas Rio Grande Compact Commissioner, on behalf of the State of Texas, I submit these comments on the Draft Environmental Impact Statement ("DEIS") for the New Mexico Copper Corporation ("NMCC") proposed Copper Flat Copper Mine ("Mine" or "Project"). I understand that the DEIS was published in the Federal Register, Vol. 80, No. 229 on November 30, 2015. I understand the final EIS may be released in the summer of 2018.

Texas only recently became aware of the Mine in a meeting with the Bureau of Reclamation ("BOR") when during the meeting, the BOR informed Texas and Colorado that it had, in 2015, approved a lease contract for the delivery of San Juan Chama Water to the Elephant Butte Reservoir ("EBR") and Caballo Reservoir ("Caballo") for the Apache Jicarilla Tribe.[1]

[1] Texas does not believe that San Juan Chama waters can be delivered by the BOR to Texas as Usable Water under the Compact without agreement of the Rio Grande Compact Commission. No accounting method is in place for delivery to Caballo as Usable Water in Project Storage. Further, the BOR does not have authority to augment deliveries without Compact Commission approval. The statements on page 15 of the John Shomaker & Associates, Inc. Hydrologic Report dated December 2017 that flows from the Jicarilla lease water will arrive at Caballo Dam are not accurate.

Texas is interested in the DEIS because of the effects that the proposed action and the proposed alternatives the Mine will have on the quantity and quality of waters apportioned and delivered to Texas under the Rio Grande Compact, Act of May 31, 1939, ch. 155, 53 Stat. 758 (the "Compact"). The Compact is an agreement between the States of Colorado, New Mexico and Texas which has been approved by Congress. The Compact apportions the waters of the Rio Grande among the States of Colorado, New Mexico and Texas. The apportionment is based on both the quantity and quality of water in the Rio Grande. Under the Compact, New Mexico is required to deliver to Texas its apportioned water from the Rio Grande. New Mexico is required to relinquish control of these delivered waters at EBR, which is above Caballo. The Compact also provides for the delivery of water from the Rio Grande to Mexico under a 1906 Treaty between the United States ("US") and Mexico.

Based upon our review of the DEIS, Texas has serious concerns regarding the Mine's affect upon the quantity and quality of water apportioned and delivered to Texas by New Mexico under the Compact. These concerns include the following:

1. Section 3.6.2.3.3 Summary of Groundwater Assessment of the DEIS states that the "Impacts to the regional water budget, including flows of the Rio Grande, would be significant." It further states that "These impacts would be large in magnitude, long-term, and certain" and that the "Impacts to water levels caused by the supply well field would be significant." [2]

These adverse impacts will have a clear and unmistakable adverse effect on the Compact as well as Texas's apportioned and delivered water under the Compact. Examples of the issues associated with the Mine's adverse impact on the Compact are described in the February 26, 2016 letter from New Mexico's own state agency, the New Mexico Interstate Stream Commission ("NISC"), where the NISC opposed the DEIS based in part on concerns that the diversion would adversely impact Usable Water in Project Storage in violation of the Compact. The NISC also described other significant Compact issues that would be created by the Mine, including storage impacts to the States of New Mexico and Colorado.

The DEIS itself and reports prepared for NMCC by its consultant, John Shomaker & Associates, corroborate that the Mine's operations, with wells situated in close proximity to Caballo, will impact Rio Grande flows and deplete water stored in Caballo.

2. Section 3.6.3 Mitigating Measures of the DEIS states that NMED and OSE (both New Mexico state agencies) have the authority to require mitigation of impacts "that are judged unacceptable in accordance with New Mexico regulations." It further states that "The BLM intends to rely on the State agencies to exercise their statutory authority in determining which impacts exceed allowable limits and what mitigating measures may be required by diversions caused by the Mine." [3]

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[2] The DEIS concludes that the impacts will last over 100 years. See pages 3-59 and 3-60.

[3] The concept that depletions from the Rio Grande or Caballo (water belonging to Texas under the Compact) can somehow be offset with waters below or upstream of the depletion (not in real time) based on New Mexico state law

This, however, is inconsistent with the Compact. Under the Compact, New Mexico is required to deliver annually an amount of apportioned water to Texas.[4] The delivery occurs in EBR in time for each irrigation season. Under the Rio Grande Project ("RGP"), which has been fully incorporated into the Compact, waters (defined as Usable Water in Project Storage) are released from EBR to Caballo for delivery to users (under contract) in New Mexico and Texas. All water in the Rio Grande released from EBR, including water stored in Caballo, is Texas's apportioned water delivered by New Mexico under the Compact. This water is for the exclusive use of Texas for delivery to users (under contract) in New Mexico and Texas.

In 2013 Texas sued New Mexico and joined Colorado in the United States Supreme Court for violating the Compact. See Texas v. New Mexico, Original 141. The US intervened in the lawsuit against New Mexico. The Court appointed a Special Master to prepare a report. As stated in the Special Master's report, "New Mexico must relinquish all control over the water delivered to Texas." Therefore, any diversion of Texas's water in the Rio Grande and Caballo for the Mine violates the Compact. The Compact does not provide that New Mexico (under its state law) can "offset' or "pay back" Texas for waters delivered to Texas under the Compact.[5] Once the water is delivered by New Mexico to Texas at EBR, New Mexico must relinquish all control over the water and further must not take any action to divert or interfere with Texas's water to be delivered to its contract users.[6]

The DEIS assumes that under New Mexico state law, the impact to the Rio Grande and Caballo will we made whole by the New Mexico OSE as it determines under New Mexico State law. Even assuming New Mexico State law would apply, the Application for diversion filed in January 2018 which the OSE assumes that water under the Jicarilla lease will be used to offset any adverse impacts to the Rio Grande and Caballo does not come close to offsetting damages to the basin as referenced in the DEIS. The lease between NMCC and the Jicarilla is for 15 years, and is only based on when water is available. The lease also expires when the New Mexico OSE on its own decides further offsets are not required. The Mine is estimated to operate for approximately 12 years, but the damages to water basin (including the Rio Grande and Caballo) will be for over a 100 years.[7]

The US is a party to the Compact and is responsible for ensuring compliance by Colorado, New Mexico and Texas. This was unanimously confirmed by the United Supreme Court in its opinion decided on March 5, 2018 in which it recognized a significant role for the US in protecting the RGP as well as the integrity of the Compact. The Court further noted that

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and should not apply to waters delivered by New Mexico to Texas under the Compact. These delivered waters are not subject to New Mexico state law, which may permit exchanges or offsets among upstream its water users.

[4] The Compact also requires that the water be of a certain quality.

[5] There is no assurance for any offset. The lease provides for San Juan Chama only if available. As stated by the NISC, any meaning offset would have to be on a "real-time" basis.

[6] Even if possible, any offset would be downstream and would not mitigate actual upstream depletions to the Rio Grande and Caballo. Further, offsets would not be in real time.

[7] See pages 3-59 and 3-60 of the DEIS.

the US "as a sort of agent of the Compact" was charged with ensuring that the Compact's equitable apportioned waters were delivered to contracting parties in Texas and New Mexico.

Based on the Court's opinion, the BLM, as an agency of the US, should not simply delegate Compact obligations to a New Mexico state agency "to exercise their statutory authority in determining which impacts exceed allowable limits, and what mitigation measures may be required." This is not a state issue. Any adverse impact of Texas' water in the Rio Grande and Caballo violates the Compact.

3. The BLM has failed to undertake a groundwater basin study recommended by its own DEIS.[8] Page 4-8 of the DEIS states, "Surface Water Use: The Proposed Action and alternatives would reduce groundwater discharge to Caballo Reservoir and the Rio Grande, decreasing surface water quantities there. This impact is expected to have a long-term, large-extent, and probable cumulative effect on these surface water resources. The cumulative magnitude of the effect can only be determined through a comprehensive mid-basin study of Caballo Reservoir and the Rio Grande."

No such study has been conducted. The DEIS has a deficient and obviously glossed over and flawed hydrologic study of the impacts to the basin, including that amounts that would divert Rio Grande river flows and Caballo. The NISC estimates that the Mine would extract approximately 60,000 acre feet of water from the groundwater system and any recovery would come directly from the Rio Grande and Caballo. The NISC expressed concern that the estimates of damages to the water system in the DEIS are suspect and fail to accurately take into account that the recovery could take a hundred years. We concur with the NISC and along with other parties believe that a further supplemental hydrology study of the basin is critical and should be conducted to determine a true and accurate impact to the water basin. This should be done before the DEIS is finalized.

4. In addition to the impact on the quantity of water delivered to Texas under the Compact, Texas in concerned that the Mine will adversely impact the quality of water required to be delivered by New Mexico under the Compact. The DEIS describes the Mine as an open pit mine operation with open trailing ponds in close proximity to Caballo. Any spill or leak from these ponds would have a disastrous environmental impact on Texas's water which is used by farmers in Southern New Mexico and Texas and the City of El Paso.

In summary, the Mine's proposed actions impact Texas's apportioned waters in the Rio Grande and Caballo that have been delivered by New Mexico to Texas, which violate the Compact. BLM has failed to do a supplemental comprehensive groundwater basin study as stated in the DEIS to determine the magnitude of these impacts. The DEIS improperly delegates the responsibility to protect Texas under the Compact to a New Mexico State agency. The Compact does not allow New Mexico to divert and then allegedly offset (or put back) waters that belong to Texas under the Compact. Texas will not be protected as stated in the DEIS. As confirmed by the USSC is its recent unanimous decision, the US as an agent for the Compact is responsible for ensuring that Compact water deliveries are made to Texas. Your DEIS violates your duty to Texas.

[8] See pages 4-8 of the DEIS, which recommends a supplemental study of the basin.

We request that the BLM reconsider its position under the DEIS and take a closer look and evaluate the obligations that the US owes to Texas under the Compact.[9] We also believe supplemental studies to the basin should be conducted.

If you have questions, we are available to meet to present our concerns.

Sincerely,

Pat Gordon

Pat Gordon
Rio Grande Commissioner,
State of Texas

cc: David Bernhardt, Deputy Secretary of Interior

Senator John Cornyn

Tom Blaine, New Mexico Compact Commissioner
Tom.Blaine@state.nm.us

Kevin Rein, Colorado Compact Commissioner
kevin.rein@state.co.us

Maria O'Brien, General Counsel, EP#1
mobrien@modrall.com

Samantha B. Salopek, General Counsel, EBID
samantha@h2o-legal.com

Edward Drusina, PE, United States International Boundary and Water Commissioner
Ed.Drusina@ibwc.gov

Stuart Sommach
ssomach@somachlaw.com

[9] The US owes and obligation to protect Colorado and Mexico as well.

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

April 12, 2018

VIA ELECTRONIC MAIL AND
FIRST CLASS MAIL

Mr. Tom Blaine
New Mexico Compact Commissioner
Office of the State Engineer
P.O. Box 25102
Santa Fe, New Mexico 87102

Re: Application for Permit to Appropriate – New Mexico Copper Corporation ("NMCC") – Notice of Violation of Rio Grande Compact

Dear Commissioner Blaine:

Texas has recently been informed that an Application for Permit to Appropriate 5,234 acre feet of water (the "Application") by NMCC is in the process of being approved by New Mexico. The Application states that this water is needed by NMCC for the operation of a mine ("Mine") located close to the Rio Grande and Caballo Reservoir.

The Draft Environmental Impact Statement ("DEIS") for the Mine and the Hydrology Report prepared by John Shomaker & Associates, Inc. dated December 2017 reflect that the Mine will have a direct, large in magnitude, and long term impact on Compact water delivered by New Mexico to Texas in the Rio Grande and stored in Caballo Reservoir. The New Mexico Interstate Stream Commission ("NMISC") confirms this in a letter dated February 26, 2016, objecting to the DEIS. I wanted to put you on notice of Texas's concerns.

New Mexico is a party to the Rio Grande Compact, see Act of May 31, 1939, ch. 155, 53 Stat. 785 (the "Compact"), along with the States of Texas and Colorado. The Compact apportions the waters of the Rio Grande between the States of Colorado, New Mexico and Texas. The Compact also provides for the delivery of water to Mexico under a 1906 Treaty. New Mexico delivers Texas's apportioned water under the Compact in Elephant Butte Reservoir. At such time, the water belongs to Texas and is only available for use by Texas and certain contract and treaty parties in New Mexico, Texas and Mexico. New Mexico is prohibited from diverting or using Texas's water.

Texas is aware of NMCC's attempts to acquire rights to water that would purportedly offset the impacts to the Rio Grande and Caballo Reservoir. The fifteen year lease that NMCC has with the Jicarilla Apache Nation for San Juan Chama water that New Mexico may require as some type of offset for the diversion of Texas's Compact water would not come close to remedying the immediate and long term depletions to the Rio Grande and Caballo Reservoir caused by the Mine. In fact, NMCC states in the Application that it needs this water to operate the Mine. The DEIS states that the impacts to the Rio Grande and Caballo Reservoir will last over 100 years. A "so called" fifteen year offset that New Mexico calculates in its sole discretion does not remedy the harm to Texas that will be caused by the approval of the Application, even assuming as stated by the NMISC that such offset was in "real-time."

As you are aware, Texas sued New Mexico in the United States Supreme Court, see Texas v. New Mexico, Original No. 141. This case is currently before the Court and is moving forward toward trial and resolution, following the Court's denial of New Mexico's motion to dismiss. Discovery will commence soon.

The NMCC proposed actions and the granting of water rights by your office will directly and adversely impact Texas. New Mexico's approval of this action, as well as granting permits for other actions (such as the Gillis pump immediately below the Caballo Reservoir), are violations of the Compact. These ongoing violations reinforce Texas's action in the United States Supreme Court and add to its recoverable damages against New Mexico.

Sincerely,

Pat Gordon

Pat Gordon,
Texas Commissioner

cc: Kevin Rein, Colorado Compact Commissioner
Hal Simpson, Federal Chairman, Rio Grande Compact Commission

Pat Gordon

From: Pat Gordon
Sent: Thursday, April 26, 2018 12:57 PM
To: david.ennis@state.nm.us
Subject: New Mexico Copper Corporation (NMCC) - Mining Permit
Attachments: Tom Blaine - Application for Permit to Appropriate NMCC - Notice of Viol....pdf

Dear Mr. Ennis:

I am the Rio Grande Compact Commissioner for the State of Texas. Attached is a letter delivered to Tom Blaine.

I want to reach out and put you on notice regarding Texas's concern and objection to the Copper Flat Mine, especially regarding its impacts relating to the quantity and quality of water in the Rio Grande and Caballo Reservoir, which is water delivered by New Mexico to Texas under the Rio Grande Compact. We believe the draft EIS issued by the BLM has errors and fails to address Compact issues which will damage Texas. Texas also has concerns with NMCC mitigating damages caused by its operations to the Rio Grande and waters in Caballo Reservoir with a lease of San Juan Chama water. Texas will raise further objections if mining permits are considered.

If you have questions, you can contact me at the address below.

Sincerely,

Pat Gordon
Rio Grande Compact Commissioner

Pat Gordon | Partner
4695 North Mesa Street | El Paso, TX 79912
T (915) 545-1133 | **F** (915) 545-4433 | **E** pgordon@eplawyers.com
GORDON DAVIS JOHNSON & SHANE P.C.
EPLAWYERS.COM DISCLAIMER

Pat Gordon

From: Pat Gordon
Sent: Thursday, April 26, 2018 1:01 PM
To: brad.reid@state.nm.us
Subject: FW: New Mexico Copper Corporation (NMCC) - Discharge Permit
Attachments: Tom Blaine - Application for Permit to Appropriate NMCC - Notice of Viol....pdf

Dear Mr. Reid:

I am the Rio Grande Compact Commissioner for the State of Texas. Attached is a letter delivered to Tom Blaine.

I want to reach out and put you on notice regarding Texas's concern and objection to the Copper Flat Mine, especially regarding its impacts relating to the quantity and quality of water in the Rio Grande and Caballo Reservoir, which is water delivered by New Mexico to Texas under the Rio Grande Compact. We believe the draft EIS issued by the BLM has errors and fails to address Compact issues which will damage Texas. Texas also has concerns with NMCC mitigating damages caused by its operations to the Rio Grande and waters in Caballo Reservoir with a lease of San Juan Chama water. Texas will raise further objections if discharge permits are considered. We believe any discharge will have an adverse impact on waters delivered to Texas.

If you have questions, you can contact me at the address below.

Sincerely,

Pat Gordon
Rio Grande Compact Commissioner

Pat Gordon | Partner
4695 North Mesa Street | El Paso, TX 79912
T (915) 545-1133 | F (915) 545-4433 | E pgordon@eplawyers.com
GORDON DAVIS JOHNSON & SHANE P.C.
EPLAWYERS.COM DISCLAIMER

BEFORE THE NEW MEXICO SECRETARY OF ENVIRONMENT

IN THE MATTER OF THE HEARING ON THE APPLICATION FOR DISCHARGE PERMIT 1840 BY NEW MEXICO COPPER CORPORATION TO DISCHARGE MINING TAILINGS AND OTHER WASTE WATERS AT COPPER FLAT MINE	DOCKET NO. 8WB-18-06 (P)

Max Yeh's Comment in Opposition to DP 1840

I am a 30-year resident of Hillsboro, New Mexico, where Copper Flat Mine is located, and I am opposed to the granting of Discharge Permit 1840 authorizing New Mexico Copper Corporation to discharge "25,264,000 gallons per day" of mining wastewater, which "may contain water contaminants or toxic pollutants elevated above the standards of Section 20.6.2.3103 NMAC," and which "may move directly or indirectly into ground water of the State of New Mexico" at the Copper Flat Mine site. [GWQB, Draft Discharge Permit 1840.]

I ask the Secretary not to grant the Permit for the following reasons:

The Discharge Permit DP 1840 should not be granted because the application for a Discharge Permit is frivolous.

A. It is frivolous because the applicant, New Mexico Copper Corporation [fully owned subsidiary of THEMAC Resources Group Ltd.], does not have the financial means to construct and operate Copper Flat Mine.

1. In its June 2017 audited financial statement, NMCC's parent company Themac Resources, shows a cash balance of $128,471 (cad), a liability of $83,807,040 (cad), no visible signs of income, and the auditor, Davidson and Co., LLP, opined without qualification:

a. "Without qualifying our opinion, we draw attention to Note 1 in the consolidated financial statements which describes conditions and matters that indicate the existence of a material uncertainty that may cast significant doubt about THEMAC Resources Group Limited's ability to continue as a going concern."

2. Not having the financial means to develop the mine, none of the conditions of the permit can be fulfilled.

B. The application is frivolous because the applicant, NMCC, does not have sufficient water rights to operate the mine according to its MORP or to reclaim the mine upon closure since the reclamation of the pit depends on more water than it can access.

1. The Expedited *Inter Se* suit within the Lower Rio Grande Adjudication adjudicating the water rights claims of NMCC and Harris Gray and William Frost, owners at the time of the water rights NMCC intends to use for mining Copper Flat Mine, granted a total of 861.84 afy for mining operations. See the Subfile Orders and Judgments for Subfiles LRO-28-008-9009 and LRO-28-008-9010 in the Lower Rio Grande Adjudication, 2/28/18. As of August 1, 2018, NMCC is full owner of those rights.

2. NMCC claims to need over 6,000 afy to operate. It has sufficient water rights to operate less than 2 months every year.

3. Reclaiming the pitlake requires 2,200 to 2,800 af of water. It will take 2.5 to 3 years to backfill the pitlake, making it a slow and not rapid refill. Since this type of reclamation of the pit allows NMCC to avoid contouring the steep pit walls to a reclaimable slope angle, the speed with which the pit is filled is crucial to avoiding pit wall deterioration. The advantages of a water reclamation are lost and may not be beneficial to the environment. Without an idea of how much water might be available, there is no way to estimate the benefits of a water filled pit as compared to some other reclamation of the pit.

C. The application is frivolous because Copper Flat Mine is a marginal mine which can operate profitably only under extremely rare conditions, so that NMCC's 11-year plan of operation has no merit at all.

1. Copper Flat ore is very low quality ore, containing roughly half as much copper as the ore at Chino near Silver City and about 1/5 the quality of average copper ores around the world. Therefore, mining Copper Flat is comparatively expensive and extremely vulnerable to copper prices and other fluctuating economic conditions. NMCC's feasibility studies show a need for $3.00/lb copper prices to operate profitably. But average copper prices in the last 118 years is $2.50/lb and no 11-year period in history has ever seen copper prices, corrected for inflation, continuously above NMCC's needed $3.00/lb. Therefore, it is extremely unlikely Copper Flat Mine will be in operation for any sustained period of time.

2. If 11 operative years cannot translate into 11 continuous years of mining, then all the calculations for reclamation are mistaken. Projections of pitlake water quality are erroneous. TSF reclamation calculated to be complete in the 39th year will be wrong. All calculations need to be done for an extended and intermittent period of mining.

The Secretary should not grant permits to frivolous applications because doing so harms the public welfare.

A. The corporate and financial organization of NMCC ensures that NMED will be working on this permit endlessly because NMCC seems to be part of a system created to lose money for tax benefits. It is returning 9% tax benefit to its Australian owner for money expended to permit Copper Flat Mine. Meanwhile, this frivolous application is a sinkhole for taxpayer money and the energies of NMED.

1. NMCC is a wholly owned subsidiary of Themac Resources, a Canadian registered company owned by Kevin Maloney, one of the richest people in Australia. Themac Resources has

no income. It and NMCC spend money on loan from Kevin Maloney's Tulla Resources. The loan carries a contractual interest of 20%, a usurious rate in some states. Themac Resources cannot pay the interest on the loan, so 20% of the loan every year can be deductible from Mr. Maloney's taxes as an unmitigated loss. See Themac Resources's website for verification. The highest tax bracket in Australia is 45%. Therefore, the deduction is worth a 9% savings on taxes in that bracket. This is a fine permanent investment for which the real costs are paid by New Mexico tax payers and the work of all the federal and state agencies involved.

a. The unpaid 20% interest is carried on Themac Resouces's financial statements as an accumulating increase of debt, from $34 million (cad) in 2013 to over $84 million (cad) at the present, a debt not taken into account in the 2013 Definitive Feasibility Study and thus making that study rather unreliable. But even that optimistic but now obsolete study (see Section 22.11 and Table 22.7) shows the operating mine's Net Present Value, a balance of costs and income, dropping to 0 when the copper price drops to $2.24 per pound as demonstrated by Professor Lloyd Barr in his comment to the BLM on the Draft EIS. Considering the ongoing 20% interest simply pushes that value higher, making economic feasibility less likely.

B. While granting the permit seems to cause no harm if no mining occurs, it makes the Copper Flat Mine marketable, and it is not the function of NMED to expend its time, resources, and energy, not to mention taxpayer money, increasing the value of private property. The state's Constitution forbids the state from selectively enriching private individuals, and the Water Quality Act, NMSA 74-6, does not authorize NMED to issue a discharge permit to increase the worth of a defunct copper mine.

1. Since NMCC filed the application for a Discharge Permit knowing it did not have either the financial means or the water rights to operate a mine, the application's intent is questionable. Since Themac Resources has been actively trying to sell the mine for some years [see Themac's press release on its website announcing the Letter of Intent to sell the mine to a Chinese company in 2016], the knowingly frivolous application must be considered a means of marketing the mine. Granting the Permit, therefore, turns the Permit into itself a commodity, setting a pernicious precedent.

C. Granting the Permit without actual operation also continues indefinitely the delay in mitigating the groundwater contamination which has been unabated for decades as a result of the previous mine operation.

D. Even though New Mexico law does not have a "can and will" rule, it is recognized that applicants for permits from governmental agencies need to apply in good faith. Colorado expresses its understanding that frivolous applications are a public harm by requiring applications for water rights to make a proper showing of the intent and ability to carry out a water project, and that the project "will be completed with diligence and within a reasonable time." [15 C.R.S. 1990 §37-92-305 (9)(b)] Nothing prevents the Secretary from applying a similar criterion for preventing waste and favoring efficiency.

1. Statements in the application which claim the mine will operate 11 years or that the mine will fast-fill the pit at reclamation are deliberate misrepresentations of reasonable expectations. The application can be denied on that basis by law. And given the company's financial situation, at the least, the Secretary should require a Disclosure Statement according to NMSA 74-6-5.1A.

The Permit should be denied because of internal flaws.

A. NMCC's fast-fill method of reclaiming the pitlake violates the New Mexico Constitution, wherein (XVI, 3) the right to use water is **limited** to beneficial use. To use approximately 2,800 af of water to avoid having to reclaim the steep pit walls or to properly reclaim the pit by earthen refill or to avoid regulatory standards of pollution is not beneficial use of water. To create a large, chemically polluted body of water is not a beneficial use of water. To waste this much water – when the 2018 Draft New Mexico State Water Plan cites insufficiency of water supply as the major water problem the state faces and the 2016 Regional Water Plan for Socorro and Sierra Counties documents this insufficiency in coming years for Sierra County where the mine's located – will irrevocably harm the people's welfare and violate the public's interest, the water being permanently lost through evaporation. If the water were used to dilute polluted water so that it could be used beneficially, the filling of the pitlake might be allowed, but here the dilution is temporary, and eventually the pitlake will be polluted, as is the present pitlake.

1. Justifying this wasteful use of water as part of the beneficial use of mining has no lawful merit. First, the use is post-closure, after productive mining has ceased. Second, and more important, the usage is peripheral to actual productive use, a distinction defined in numerous court cases. In *State ex rel. Martinez v. McDermett*, 120 N.M. 327, § 13, the New Mexico Court of Appeals distinguishes productive agricultural use – meaning to grow crops - from peripheral uses such as using water to soften land to prepare it for plowing. The same distinction is made in *Hennings v. Water Resources Dep't.*, 622 P. 2d 333 (Or. 1981). In *Blaine County Inv. Co. v. Mays*, 291 P. 1055 (Idaho 1930), the court decided that to preserve soil moisture by using water during the winter to form an ice cap over the soil was not a beneficial use of water but a waste. In *Joslin v. Marin Mun. Water Distr.*, 429 P. 2d 889 (Cal. 1967), the Supreme Court of California sitting in bank declared the use of water at a mine to transport gravel and sand was an unreasonable and unlawful form of beneficial use of water. The denial of peripheral uses of water as beneficial use has a solid base recognizable in New Mexico. See *United States v. Alpine Land and Reservoir Co.*, 697 F. 2d 851, 854 (9th Circ. 1983) ("We do not deny or overlook the differences in water law among various western states. However on the point of what is beneficial use the law is 'general and without significant dissent.'") (citing 1 Waters and Water Rights § 19.2 (R. Clark ed., 1967).

2. Before proceeding to permit, the NMED should seek an opinion from the legal branch of the OSE as to the legality of wasting water in New Mexico.

B. NMCC had originally planned to divert impacted storm water into the tailing pond, but now the impacted storm water is to be kept in three impoundments (SW-A, B, C) and the water used in processing (see Draft Permit, fig. 3). NMCC does not have any rights to use surface water. This aspect of the Permit violates NM water law.

C. Because HDPE is considered only resistant and not proof against water penetration, all normal use of HDPE liners includes an under-drain system and a detection system underneath the primary liner. However, the design of the tailings pond (TSF) moves the drainage system above the HDPE liner. The change violates NMAC 20.6.7.22A(4)(d)(v) requiring a "tailings seepage collection system." The above liner system is simply to recover water for reuse and does not protect against contaminant penetration into groundwater. It is not an "under drain."

1. Using a gravel bed for the liner in the TSF instead of a compacted clay bed allows leakage (expected) to leach into the ground. The Copper Rule, then, requires the use of a surround of wells and pumps to pump contaminated groundwater back to the tailings pond. NMAC 20.6.7.22A(4)(c) on interceptor system.

a) Since the TSF area is already contaminated, the Copper Rule mandates the use of an interceptor system from the inception of the use of the TSF.

b) NMED needs to see the design of that system, the number, depth, and location of wells, the studies that show that the wells will recover all the contaminated water moving, and most importantly, proof that NMCC has the water rights to pump the groundwater in sufficient quantity to make the interceptor system work.

D. Monitoring wells for the TSF are insufficient on the south side, where between GWQ-12 and PGWQ-19 is a gap of 1/3 mile.

E. The center-line construction method for the TSF dam is a compromise and not the Best Management Practice. As with the upstream construction method, the upstream side of the dam has no solid base but rests on old tailings, and neither the stability analysis nor the subsidence study covers that weakness.

F. The avoidance of NMAC 20.6.2.3101pollution standards and federal pollution standards in the future pitlake by building a ledge of BLM property so that the water is kept entirely on private land is mere trickery and should be responded to as trickery.

1. The ledge of BLM property will be 3 feet above the equilibrium level of the future pitlake. But a 100 year storm event of 3.73 inches in 24 hours will raise the pitlake level over 3 feet (using a run-off area of 306 acres) and a storm event 3 times that (the safety factor used for the TSF) of 26 inches in 72 hours, will raise the lake level by 31 feet and not evaporate off for 6 months or more. The larger numbers are justified by the fact that the pitlake will be there ad infinitum, and thus experience many 100 year storms and more. The pitlake, therefore, cannot be permanently exempt from either federal or state pollution standards. See NMSA Water Quality Act 74-6-12C. And, even when there is not an exceptional storm event the effects of 22 acres of polluted water are not confined to private property because of the effects on wildlife, so that the state's exemption does not apply.

G. The pitlake is also allowed exemption from NMAC 20.6.2.3101 pollution standards because it will be a "hydrologic evaporative sink" by 20.6.7.33D(1). But this is not necessarily so. The present pitlake has been there for 35 years, and with a calculated evaporation of 34.45 afy, it should be dry by now if evaporation were <u>greater</u> than inflow (the legal definition). Obviously the water has reached an equilibrium level at which inflow <u>equals</u> evaporation. It is by legal definition (which is not necessarily a hydrological definition) not to be considered a hydrological evaporative sink since evaporation is <u>not greater</u> than inflow. Since the future pitlake is conceived to also be at an equilibrium level, it also will not fit the legal definition of an evaporative sink, and further, whenever the humidity is high and evaporation low or whenever it rains, that evaporation will be less than inflow. That is to say, equilibrium level for the future pitlake is based on annual averages of

precipitation and evaporation rates. Actual levels vary from day to day, and similarly, whether evaporation is greater than inflow varies also.

1. Reclamation of a mining pit by backfilling with water is not a normal procedure in mining. Treating the pitlake as an evaporative sink has been tried in West Australia, but not in the way planned by NMCC. The pit is first earth filled to a level below the equilibrium level of the evaporative sink, and then the water is introduced to the equilibrium level. In West Australia, as in New Mexico, water is too precious to use for a complete backfill of the pitlake. NMCC's plan is wasteful of water. See Exhibit I, Clinton Mccullaugh, Genevieve Marchant, Jorg Unseld, Michael Robinson, Benjamin O'Grady, "Pit Lakes as Evaporative 'Terminal' Sinks: An Approach to Best Available Practice Mine Closure," Edith Cowan University, ECU, 2012 (online) (originally published in Proceedings of International Mine Water Association (IMWA) Symposium 2012, pp 167-174). In the United States, backfilling the pit with earth to the original contours is required of all coal mines regulated by the federal rules. All hardrock mines in California are required to backfill pits with earth at reclamation. Many contemporary mines backfill the pit with earth at closure. Proper reclamation of the pit should be backfilling with earth rather than water.

H. The Existing Waste Rock Stockpile-1, at the west side of the pit, is to be removed and water from that area channeled to Greyback Arroyo, but this rock pile has been leaching contaminants for over 35 years. After removal of the pile, the contaminants will be drained into a naturally intermittent stream. This contamination of surface water is not permissible.

I. The Permit cannot be approved without an adequate Reclamation Plan. The submitted Reclamation Plan does not address the following issues:

1. Since the TSP area is already contaminated from mining 36 years ago, the Copper Rule mandates an interceptor system from initiation of mining. How will this system operate after closure? Will monitoring at the monitoring wells below the TSP be continued at the same frequency?
2. If an interceptor system is not in place at closure, who will construct one if the monitoring detects contamination below the TSP dam during active evaporation?
3. Once the HDPE liner is ripped, will monitoring continue below the TSP. How will contamination plumes thereafter be mitigated? Who will do the work and who will pay for it?
4. While application projects no contaminants in the pitlake, there is some doubt about this, especially since the pitlake is left as a permanent feature of the landscape. Should it become contaminated (and twice the present pitlake has become naturally acidic, due probably to rainfall), what will be the mitigation? In 100 years? Is this left to the NMED to handle?
5. Proposed sureties do not seem to imagine or to cover expenses for any possible complexities. Who will pay for them, since fines for groundwater contamination are limited to $10,000 per day, hardly sufficient for a major cleanup.

Max Yeh
P.O. Box 156
Hillsboro, NM 88042
September 16, 2018

EXHIBIT I

2012

Pit lakes as evaporative 'terminal' sinks: an approach to best available practice mine closure

Clinton Mccullough
Edith Cowan University

Genevieve Marchant

Jorg Unseld

Michael Robinson

Benjamin O'Grady

Pit lakes as evaporative 'terminal' sinks: an approach to best available practice mine closure

Clint D. McCullough[1,2], Geneviève Marchant[1], Jörg Unseld[1,3], Michael Robinson[4], Ben O'Grady[5]

[1]*Golder Associates Pty Ltd, West Perth, Western Australia 6005, Australia*
[2]*Mine Water and Environment Research Centre (MiWER), Edith Cowan University, 270 Joondalup Drive, Joondalup, Western Australia 6027, Australia*
[3]*Current address: FMG, Perth, Western Australia, Australia*
[4]*Birla Nifty Copper Operation, Perth, Western Australia 6000, Australia*
[5]*Mount Gibson Mining Ltd, West Perth, Western Australia 6005, Australia*

Abstract

Pit lakes may form when open cut mining operations extend below groundwater level and then fill at cessation of mining and associated dewatering operations by ground and surface water influx. Pit lake hydrogeology may function as an evaporative "sink" when pit lake water evaporation rates exceed influx rates. Although not ideal closure, management of local surface and groundwaters contaminated by Acid and Metalliferous Drainage (AMD) through entrainment toward an evaporative terminal pit lake may provide a best-case scenario for protection of regional water resources required by typical mine closure time scales of hundreds to thousands of years.

We present two case studies from Western Australia; the first where closure of above ground landforms such as waste dumps by covers would arguably not be successful over long terms (1,000 years or more) and another where Potentially Acid Forming waste (PAF) management is limited by current waste rock dump location and suitable cover materials.

Pit lake water balance modelling indicates both case study pit lakes will function as hydraulic sinks if they are not backfilled above their equilibrium water levels. A best closure outcome for these pit lakes may be to be backfilled with PAF encapsulated with alkaline/neutral waste and then filled as rapidly as possible to minimise PAF oxidation and ensure an evaporative sink pit lake is formed.

Keywords: backfill, groundwater sink, closure, pit lake, AMD, through-flow, evaporative sink

Introduction

Due to operational and regulatory practicalities, pit lakes will continue to be common legacies of mine lease relinquishments. Pit lake water quality is often degraded by Acid and Metalliferous Drainage (AMD) which may lead to acidic water with elevated metal concentrations (McCullough 2008). Degraded water quality reduces pit lake environmental values and may present risks to surrounding communities and environmental values (McCullough and Lund 2006). Mine closure guidelines and standards increasingly require chemical safety and low risk to surrounding ecosystems for long-terms for closure practices to be acceptable (ANZMEC/MCA 2000; ICMM 2008; DMP/EPA 2011).

Unplanned or inappropriate management of these novel geographical features can lead to both short- and long-term liability to mining companies, local communities, the government and the nearby environment during mining operations or after lease relinquishment (Doupé and Lymbery 2005).

Nevertheless, most developed jurisdictions are consistent in their requirement for mining companies to plan and/or rehabilitate to minimise or prevent entirely any potential deleterious effects of the pit lake water body on regional ground and surface resources (Jones and McCullough 2011). The focus of most general or *ad hoc* pit lake regulation is given to protecting human and ecological communities from effects of the pit lake. For example, in Australasia, closure guidelines are based on ANZECC/ARMCANZ (2000) criteria; generally for ecosystem protection requirements. Such guidelines generally emphasize either a demonstration of null-negative effects of the lake or require management to achieve the required level for compliance (Kuipers 2002). AMD treatment may be very costly and difficult to achieve in many remote mining regions. As a result, sustainable pit lake management aims to minimise short and long term pit lake liabilities and maximise short and long term pit lake opportunities (McCullough et al. 2009).

Pit lake water balance in an arid climate

Climate is the single most important factor on the hydrologic processes associated with a pit lake (Castendyk 2009). Changes in climate (e.g. temperature, rainfall, wind, precipitation amount and distribution) will affect the individual hydrologic components differently. In general, surface hydrologic processes (e.g. direct precipitation, evaporation, surface water runoff) are defined by regional climate. Groundwater inflows are generated from precipitation recharge and tend to buffer short-term climatic changes, but long-term climatic changes will be reflected in groundwater inflows over the long-term. Modelling of groundwater and climate processes is often used to predict final water balances in pit lakes (Vandenberg 2011).

Post-closure pit lakes in an arid environment are typically classified as either "through-flow" lakes or "evaporative sinks" (Niccoli 2009). Evaporative sinks may occur in arid climates where the evaporation potential is higher than average rainfall runoff. During groundwater cone-of-depression rebound and pit void filling, the pit lake water level rises to a level where inflows (rainfall, runoff and groundwater inflow) are in equilibrium with evaporation losses. Hence, pit lake water level does not rise to levels higher than adjacent groundwater levels and water is not released to the environment (Figure 1). The water quality of evaporative sink lakes is expected to show increases in acidity, metals and salt concentrations over time through accumulation of solutes introduced through groundwater inflows, surface catchment run-off and direct rainfall to the developing lake's surface.

Backfill is often recommended to avoid many issues associated with poor pit lake water quality developing from weathering of PAF material in the pit void and pit lake walls (Puhalovich and Coghill 2011). If backfill volumes and distributions are small enough to permit accumulation of water above the backfill, then this use of the pit void as a waste rock or otherwise dump will remove these waste materials

from the typically higher rates of weathering and transport encountered when placed above ground. However, the pit backfill volumes and/or placement will cause pit lake surface area reductions and alter the pit lake hydrological balance. Decreased net evaporation may then lead to the pit lake changing from a evaporative sink lake to a through-flow type. If the water quality in the pit lake is poor, this contaminated water may be released into the environment through seepage into the regional groundwater system.

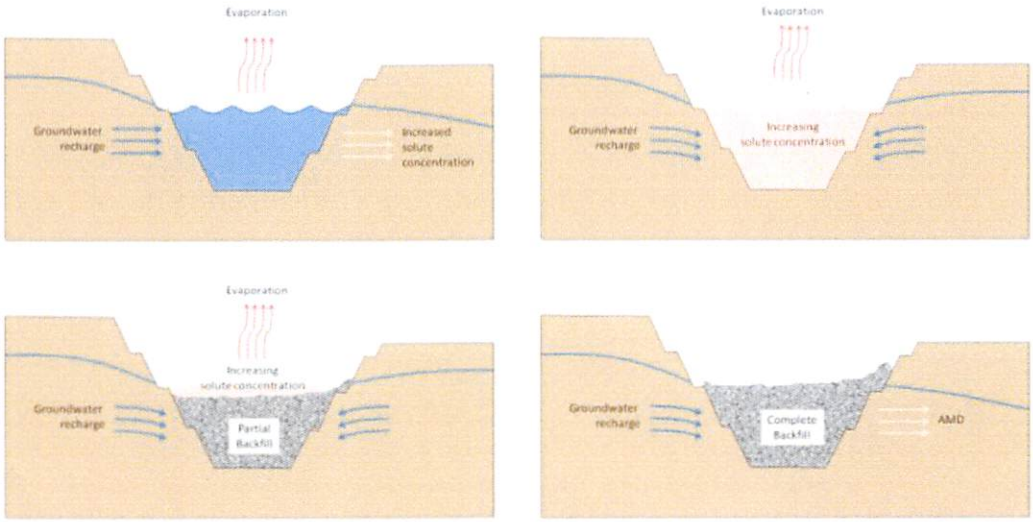

Figure 1 *Generalised potential hydrogeological regimes for pit lakes in an arid region.*

Case studies

Although there are many examples for successful dumping of mine waste under wet covers or at the bottom of pit lakes (Schultze et al. 2011), we present two case studies from semi-arid and arid Western Australia that will be relevant to many other arid/semi-arid parts of the mining world e.g., south-west US, South Africa, etc. (Figure 2). Both operations are currently working towards development of detailed mine closure plans but face difficulties with Potentially Acid Forming waste (PAF) management in above ground waste landforms where armouring and waterproof waste cover materials are lacking in their regional environments which instead primarily consist of highly dispersive clays and sand. Geochemical testing indicates both pit lakes are likely to develop AMD affected water quality over time.

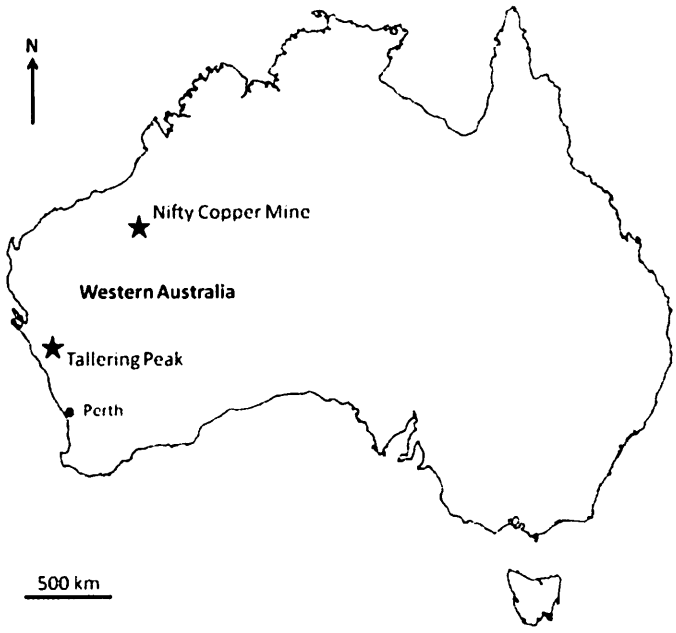

***Figure 2** Location of case studies in arid Western Australia.*

Both operations' pits are expected to fill with water naturally when pit dewatering ceases at closure due to the accumulation of groundwater inflow and rainfall, however, the equilibrium lake elevations depend on the hydrogeology setting and the long-term climatic characteristics in the region. Total inflows into the pit lakes are expected to gradually decrease as the open pits fill while total outflows are expected to increase due to increased evaporation from an increasing lake area. At some stage, total inflows would approximate total outflows and the water level in each open pit will reach equilibrium, albeit responding dynamically to changes seasonal precipitation and evaporation rates. Water level fluctuations are expected as a result of occasional cyclones.

If the steady-state pit lake elevation remained lower than the surrounding groundwater surface, the pit lakes will remain an evaporative sink within the confines of the open pit with no water release into the environment through groundwater decant. However if the final pit lake elevations reach the surrounding groundwater level, the pit lakes would turn into a through-flow system with water release to the environment through groundwater seepage which could than spread potential contaminant plumes to environmental receptors.

Modelling

A water balance model for each of the closure scenarios was then modelled using the GoldSim Monte Carlo simulation software package. Golder assessed three post-closure scenarios for both of the case-study open pits: pit not backfilled and a pit lake forming, pit partially backfilled to below pre-mining groundwater levels with consequently shallower pit lake forming; and, pit backfilled to above water table, no pit lake forming.

Pit lake hydrological inflows were defined as direct rainfall, groundwater inflow and run-off (catchment and pit walls). Outflows were defined as evaporation from

lake surface, groundwater seepage (if any), and overflow (if any) and climate change predictions were accounted for (**Figure 3**).

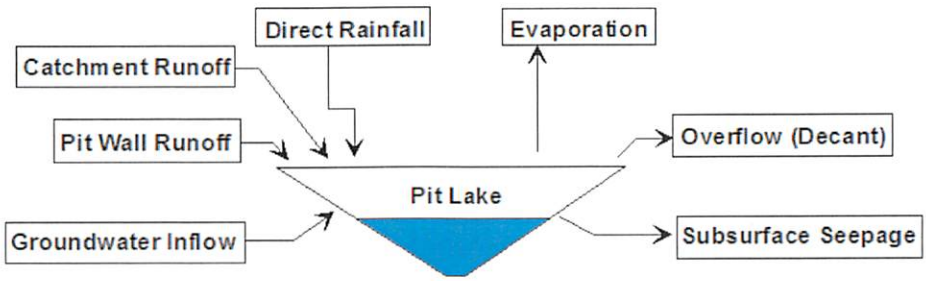

Figure 3 *Conceptual pit lake process flow diagram.*

Nifty Copper Operation, Aditya Birla

Nifty is located in the Pilbara region of Western Australia approximately 1,200 km nor-north-east of Perth (Figure 2). The Pilbara experiences an arid climate with two distinct rainfall patterns. In summer, rainfall occurs from either tropical cyclones or thunderstorms, while the winter rainfall is typically from low pressure trough systems. Average annual rainfall is low and varies in the region from 200 mm to 420 mm (Kumar et al. 2011; Kumar et al. 2012) .

The open pit scenario with no backfill was identified as an evaporative sinks. The partially backfilled scenario shows that the equilibrium water level would be more than 10 m higher than the elevation of the backfill material which would then be submerged at pit lake water level equilibrium. The partially backfilled scenarios was identified as developing an evaporative sink. The fully backfilled scenario indicated that the pit would become a through-flow system with water contained in the pit will seep into the groundwater system. If the PAF material already contained in the pit leached chemicals harmful to the environment, this closure option may be present a significant risk at mine closure.

A partially backfilled option was based on the proposed volume of backfilled material provided by the mining company at the time which would reach an expected elevation. This model showed two main consequences to site AMD management at mine closure if the pit was backfilled above equilibrium groundwater level:

1. Reduction in evaporative losses from the absence of pit lake forming would likely lead to a through-flow scenario where groundwater quality would likely be strongly influenced by the geochemistry of pit backfilled material. As the proposed material was predominantly containing PAF, it is therefore likely that water quality would be impacted by AMD as it flows through the pit waste backfill. Due to the through-flow nature of the backfilled pit, the water would then be released to the environment through groundwater seepage, leading to increased risk of negative effects on local and possibly regional groundwaters.
2. If waste landforms are not provided with an effective cover system to reduce infiltration and if the pit lake did not form due to groundwater levels after cone rebound remaining below final pit void backfill surface levels, then this may

also affect the transport of contaminants arising from other above-ground waste landforms. In this scenario, AMD leachate from waste rock dumps containing PAF would enter the vadose zone (area of unsaturated ground above the water table) but would not be transported in the local groundwater plume toward the groundwater sink lake. Instead the AMD plume would be transported by the regional groundwater system and potentially surface water receptors such as groundwater dependant ecosystems of seasonal lakes, creeks and wetlands.

Tallering Peak Iron Ore Mine, Mount Gibson Mining

Tallering Peak iron ore mine is located in the semi-arid Midwest mining region of Western Australia (Kumar et al. 2012), approximately 300 km north of Perth. The Tallering Peak Operation commenced production in 2004 and is predicted to continue operations until 2013.

A partially backfilled option for the T5 pit was based on a proposed volume of backfilled PAF material and assumed the backfill material would be placed in the bottom of the pit and not end dumping from the edge of the pit. After closure, the partially backfilled mine void is expected to fill mostly through groundwater inflows. The final pit lake would be above the backfill, covering the PAF material. Oxidation rates of the PAF material might then be significantly reduced because of the much lower oxygen diffusion rates through water. A final evaporative sink would also entrain AMD contaminated waters away from sensitive environmental receptors such as a nearby ephemeral creek which flows into the Greenough River.

Based on the results of the above analyses, the open pit with no backfill and the partially backfilled scenarios were identified as likely evaporative sinks. The fully backfilled scenario was predicted to be a through-flow system and would therefore be likely to introduce AMD into the groundwater system. While an evaporative sink is unlikely to introduce leachable compounds into local groundwater system, a through-flow system from up-gradient to down-gradient toward a seasonal creek line in the south-west is probably. Furthermore, there was only 5% chance after 35 years that the fully backfilled pit water level would rise high enough to decant to nearby surface waters.

Conclusions

Mine closure is increasingly recognised as a whole-landscape development exercise which must take into account all closure landform elements and how they will interact over time (McCullough and Van Etten 2011). Both of these case studies present strong arguments that completely backfilled pit may not be the best solution to risks presented by pit lakes at mine closure, when long-term effects of climate and above ground closure landforms risks are also considered.

The water quality of evaporative sink lakes is expected to deteriorate over time through evaporation and the consequent entrapment of solutes. Although not desirable in itself, this water quality deterioration indicates that the pit lake is functioning as it should as an evaporative 'terminal' sink and protecting the surrounding environment from AMD (acid and metalliferous drainage) contaminated waters resulting from waste rock dumps.

In the long term, increasing solute concentrations in the evaporative sink pit lake may result in increasing water density. This concentration change may cause density-driven flow into the surrounding groundwater under certain hydrogeological conditions and should be investigated as part of the risk assessment process for this closure strategy.

Stability of physical and chemical conditions inside the deposited waste and at its interface with the lake environment is the main prerequisite for successful long term storage of waste in a pit lake (Schultze et al. 2011). As such, climate change should be a key consideration in the use of pit lakes 'sacrificially' as evaporative sinks. For example, an increasingly wet climate may lead evaporative sink pit lakes to become through-flow or decant to the environment through other means such as over flow. Similarly, even though mean net precipitation may not change or even decrease in a predicted drying climate, an increase in intense rainfall events such as cyclone frequencies may lead to mobilisation of degraded pit lake waters to the surrounding regional groundwaters following such events.

In conclusion, although proposed as best practice by a number of regulatory and sustainability organisations, fully or partially backfilled pit may sometimes potentially lead to poorer closure outcomes than retaining a pit lake. This example demonstrates both the need for mine closure planning to be considered site-specific and on a case-by-case basis as well as for closure strategies to be founded on good empirical evidence of which water balance and geochemical modelling will be key considerations.

Acknowledgements

Thanks to Hugh Jones (Golder) and an anonymous reviewer for constructive advice.

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Sept 24, 18

Dear NM EID

Comment by Taylor Streit

HC 31 Box 712

Caballo NM 87931

I like living on the frontier. But it has its drawbacks and when there aren't many people around bad things happen to the environment. Such was the case with the Moly Mine on the Red River in northern NM a couple decades ago. There was little opposition but myself and a handful of people--the Concerned Citizens of Questa--went to a lot of these meetings. But molybdian prices stayed high so our work didn't amount to much.

But that was a different time and if a mine was proposed near present day Taos—there wouldn't even be a meeting. Who cares what happens between Array, Hillsboro and Caballo? Those tiny towns are somewhere near the extremely remote Aldo Leopold Wilderness.

In the north I saw a relatively small mine turn into a huge beast that broke all the rules. I watched it devastate the lonely blue ribbon trout fishery of the lower Red River where I made my living. Not that the government didn't lay down the law. The Moly mine was fined what amounted to pocket change regularly.

When the operation pulled out it left a mess. Instead of doing the right thing and cleaning up the vast rubble, contaminated dirt and water, the mining companies fought the superfund process vehemently. And when our superfund committee was given a tour of reclaimed land we burst out laughing at a "reclaimed" slope we were taken to. There was two bushes growing out of a pile of smallish boulders!

We thought this was a joke, but the gal who was showing us around had such a hurt look on her face we realized she was getting well paid to visualize a garden.

The town of Questa's people had many health problems from exposure to heavy metals. These were ongoing problems because when the mine pulled out it left the town's water system bedded in tailings, the air full of nasty white dust in spring winds. The people—who were formally called miners-- all of a sudden were simply "the unemployed". Many were forced to move on from what was their historical homes. And there were lots of social and criminal problems too over the years. Like the 12 unsolved murders that had occurred over the mines tenure.

I have moved to this lonely place in southern NM and don't want to see the same thing happen here. At my tender age I am more interested in catfishing than "hike in" trout fishing. But if I get in shape its possible, because we have the southernmost Rio Grande Cutthroat trout fishery in the world. ((That's our state fish by the way.) the Animas aint much of stream; and it usually dries by the time it gets near the proposed mine wells, but it has a population of Rio Grande cutthroat trout above the Ladder on public land. But when that mammoth well starts a pumpin we can be sure that it will suck on the Animas aquafer so powerfully that it will dry it up even up even up into the Wilderness.

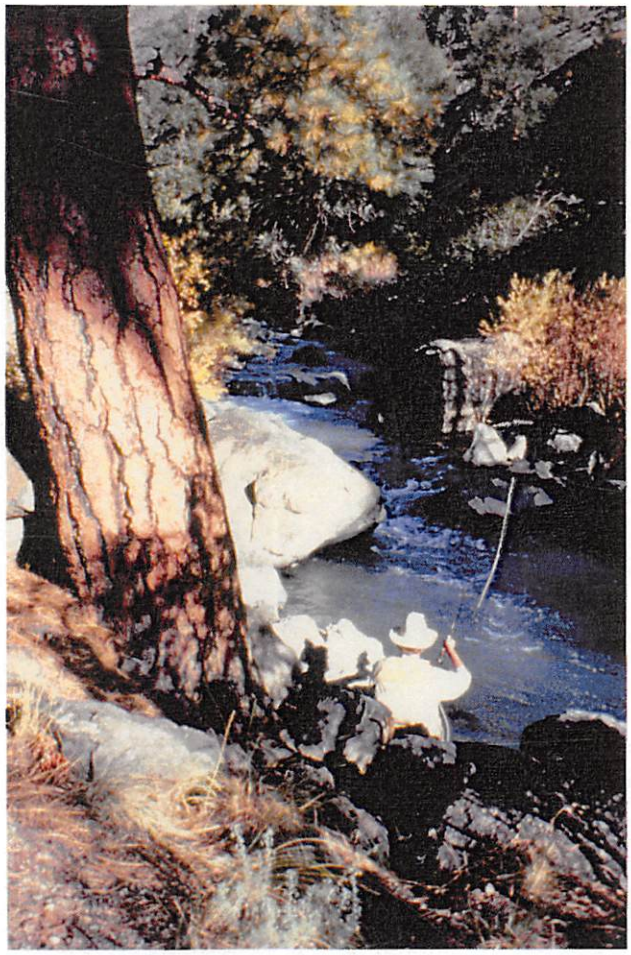
And then there is the downstream element too. Where me and my prized well and two peach trees are. Besides myself there are many other lifeforms: rare Arizona Sycamore, catfish, hatch green chili, pecans, waterfowls, cows, quail, deer, bighorn, farmers and even Texans.

I care what happens to all this life–don't you? But this "you" I speak of is just a few of us, and so we rely on the NM EID to do the right thing and not permit this mine.

This is my comment and I have included two photos from my book **Man vs Fish.** (From the story—Down on the Red.) The rare early photo is from 1980 and shows a clear Red River. The other—and later—

photo shows the blue/gray Red river of today. Which is now considered the standard water quality. As the story sadly points out, I unfortunately, remember a different, clear water Red River.

The clear water of the lower Red River, circa 1980. Photo by Mary Lou Polaski



Note the blue tint of the modern-day Red River.

the reel as fast as possible, giving the fish slack—the idea being that the current would carry the fly line below the ignorant creature, looping below the fish. Theoretically, when the line pulled from the other direction, the fish would lose track of the crafty angler and stop.

It seemed to work—the line went slack anyway—and either I had lost him or he was stopped. But I was on the wrong side of the log; and if our boy was still hooked, he was way downstream. Literally—around a bend I could see through the branches. Anything for such a fish! So I gulped some air, held my nose with one hand and the rod with the other, and under the log I dove. I bobbed back up to the surface and splashed on

Baca, John, NMENV

From: Susie Bussmann <suceppib@gmail.com>
Sent: Monday, September 24, 2018 10:14 AM
To: Baca, John, NMENV
Subject: Docket No. SWB-18-06(P)

Follow Up Flag: Follow up
Flag Status: Flagged

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Dr. Susan Bussmann. My family farm is just 3000 feet north of the of Copper Flat Mine production well field, and I urge you to deny the discharge permit for this alleged mining operation. There is just no way these foreigners will operate this mine for 11 straight years and fulfill the cleanup requirements, bond or no bond. The 10 largest copper mines in the western hemisphere produce more in 11 days than this operation would in 11 years, and when they do go under the fine people of New Mexico will be left holding the bag for the cleanup, as they already have. Just say no, thank you.

Dr. Susan Bussmann

HC31 Box 89

Caballo NM 87931

Baca, John, NMENV

From: Ramona Blaber <monablaber@gmail.com>
Sent: Monday, September 24, 2018 10:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit 1840

Hello Mr. Baca — Is this the correct email address to send written comments to on the Copper Flat Mine permit, and what is the deadline?

Thanks,
Mona Blaber
Sierra Club Rio Grande Chapter communications director
505-660-5905

Baca, John, NMENV

From: Al Webster <awebster.sar@gmail.com>
Sent: Monday, September 24, 2018 11:10 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The ground water, and in fact, ***all*** water, is extremely important for both human and livestock consumption and for agricultural use here in New Mexico. If the water is not fit for those uses it is lost for human use.

The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water the supply even if it does not contaminate groundwater.

Please do not permit the Copper Flat Mine to have any such discharge permit.

Thanks,

Al

Al Webster
Lamy, NM
C: 505.901.2073

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

The draft proposal for the Copper Flat Mine should be denied for a number of reasons. There is inadequate characterization of the bedrock. Mine pollutants would probably not be adequately contained to prevent groundwater pollution.

Water quality standards are not relevantly addressed, and the proposed groundwater monitoring wells are inadequate.

The discharge permit, authorizing up to 25.3 million gallons per day of potentially polluted wastewater is wholly unacceptable. The impact on streams, humans, wildlife and endangered species could be seriously affected by contamination; even the potential risk is unacceptable.

The amount of water needed for the mines use is staggering to even consider in our arid climate. Pumping our precious water resources would adversely drain and damage our ecosystem, local streams, and the Rio Grande. Not acceptable.

NMCC is not a trustworthy steward. They have been cited for numerous violations.

There is no guarantee that the mine would meet the Water Quality Act, and in this time of loosening environmental regulations, I do not trust that any serious enforcement would occur if NMCC failed to comply.

I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

From: Robert McCorkle <frogman3030@gmail.com>
Sent: Monday, September 24, 2018 11:15 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dr. Mr. Baca: I would like my comment to be entered in the record, noting my strong desire to see Copper Flat's discharge permit denied. Allowing 113 million tons of copper tailings to be contained behind a 2-mile sand dam for more than a decade is inviting catastrophe that could adversely impact the drinking water of tens of thousands of us living in the Mesilla Valley. That's a risk not worth taking. Wildlife, too, will be negatively impacted by the polluted tailing pond. Furthermore, the immense quantity of fresh water that would be used in the mining operations for the next decade would be much better used to sustain an ample water supply for agricultural and domestic uses. A front-page story today in the Las Cruces Sun-News noted that due to prolonged drought and lack of snow runoff into the Rio Grande this past winter (the least runoff since the dam was built in the early 20th century), Elephant Butte Reservoir is at 3 percent capacity. Under this scenario, if sustained, the importance of groundwater will be greatly elevated. Allowing Copper Flat Mine to pump 23 billion gallons of water from the aquifer over 11 years is nothing short of insanity. Permit 1840 should be rejected.
Thank you,
Robert McCorkle
Las Cruces, NM

Baca, John, NMENV

From: Michael Madrid <mjmadrid@lcps.net>
Sent: Monday, September 24, 2018 11:16 AM
To: Baca, John, NMENV
Subject: In the matter of Copper Flat Mine's Discharge Permit

Please, please, please don't allow the mining industry to pollute our drinking water! We live in a desert and there are few places where the meme "Water is Sacred" is more applicable than the desert southwest. Our survival in the desert is precariously balanced on the fact that we (I'm including wildlife) rely on clean, safe drinking water.

Please deny Copper Flat's discharge permit. All living things here will thank you.

MJ Madrid

For sale: antique desk suitable for lady with thick legs and large drawers
from Addled Ads in *Anguished English* by Richard Lederer

Baca, John, NMENV

From: Swan Webb <swan.webb@gmail.com>
Sent: Monday, September 24, 2018 11:26 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The proposal to build a copper mine near Hillsboro is absolutely insane for a couple of reasons:

(1) Clean water is one of our most precious natural resources. The Rio Grande watershed is already diminished and and polluted. This would absolutely make the situation worse.

(2) New Mexico is currently being sued by Texas in the US Supreme Court over not delivering enough water to Texas in the Rio Grande. This water use would only make the situation worse.

(3) The Rio Grande Valley in general, and Hillsboro in particular, benefit greatly from outdoor activity, hunting, fishing and tourism. These long-term, sustainable and job creating industries are all threatened by this toxic mine.

Extractive and toxic industry is not the key to New Mexico's future. New Mexico Copper has no right to make life worse on millions of people by taking and polluting our water so they can make a few bucks. Please reject this reckless and dangerous proposal.

Thanks and regards,
Swan Webb
Downriver in Las Cruces

Baca, John, NMENV

From: Walter Bishop <walterjb1@yahoo.com>
Sent: Monday, September 24, 2018 11:29 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Copper Flat Mine knew from the beginning of mining in New Mexico that there would be liquid wastes that they could not process to make it safe to discharge. Now, they want to make their problem to become the citizens of New Mexico's problem.

I say "No."

Walter Bishop
PO Box 841
Elephant Butte, NM 87935
310 686 8336

Baca, John, NMENV

From: Donald Smith <pithouse@outlook.com>
Sent: Monday, September 24, 2018 11:36 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumpedfrom wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water."

Donald H Smith

Baca, John, NMENV

From: Richard Altrock <altrockr@hotmail.com>
Sent: Monday, September 24, 2018 11:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit-1840

I cannot imagine that the department is even considering this horrible permit. This permit should be immediately refused! Any mention of contamination of ground water should cause it to be rejected. If it is accepted, I will call for an investigation into criminal influence.

Richard Altrock, Ph.D.

Baca, John, NMENV

From: JMR <jmr@pwross.com>
Sent: Monday, September 24, 2018 11:45 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

My name and address are as follows:

James Ross

PO Box 16258

Las Cruces, NM 88004

I am Against Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Baca, John, NMENV

From: Rob Wilson <gdoldrob@earthlink.net>
Sent: Monday, September 24, 2018 11:46 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

How can we even think of considering approval of this permit after the dry winter and summers we have experienced. Pumping or draining that much contaminate into our precious ground water is totally unthinkable. Don't let it happen. The Rio Grande is under enough pressure as it is; doing more damage to it is unfair to New Mexico and all others down stream.

Robert G. Wilson
Santa Fe

Baca, John, NMENV

From: Rebecca Walding <studio50@swcp.com>
Sent: Monday, September 24, 2018 12:09 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern,
I am appalled to think it is possible for New Mexico Copper to get a permit to dump ANY contaminated waste, let alone into or near New Mexico's water supply. This is a terrible idea with incredibly negative consequences that they are saying is likely to go into the groundwater.

Please, just say "No!"

Rebecca Walding
50 Main Street
Cerrillos, NM 87010
505-474-4931

Baca, John, NMENV

From: Deborah Guerra <guerra.deb@gmail.com>
Sent: Monday, September 24, 2018 1:02 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

New Mexico Copper

The New Mexico Environment Department Discharge Permit-1840

This permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

Dear Email Hearing Clerk John Baca,

Some of the many reasons to reject this permit

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond

will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Debbie Guerra
Silver City, NM
88061

Baca, John, NMENV

From: Nolan Winkler <nolanwinkler@windstream.net>
Sent: Monday, September 24, 2018 1:04 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)
Attachments: hearing statement.docx

I hope to take my 3 minutes at Tuesday's hearing but if something happens I cannot, I am submitting my statement for the NM Environment Department.
Thanks so much,
M. Nolan Winkler (ms.)

In the matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

First I would like to read part of New Mexico's Constitution that I feel is important to granting this discharge permit.

Article 22, Section 21 of the Constitution of the State of New Mexico says, **"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."**

I would ask if leaving 700 vertical feet of steep pitfalls after mining 'protects' the state's beauty or health. This seems to benefit TheMac and NOT the people.

Second, I am confused about letting this Discharge Permit go through at this time as the Australian company that owns the mine has not yet secured enough water to allow it to function more than 1 1/2 or 2 months of a year. If they cannot secure more, that means their 11 years of working time would extend way into the future. My concern is, trying to learn from the history of like mining, would they even be in business so many years down the road. I would ask that this Discharge Permit not even be considered until the mine has secured enough water to function.

Third, I am told the Reclamation Bond of 54 million dollars the mine suggests has not been legally set and I again ask that the Discharge Permit not be considered until a Reclamation Bond is in place.

I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

Baca, John, NMENV

From: Bo Bergstrom <bo.cinesthetic.30.yx@gmail.com>
Sent: Monday, September 24, 2018 1:10 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr Baca:

I oppose this permit for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank for you taking my citizen's opinion.

--Sincerely, Bo Bergstrom, 30 Village Rd., Silver City NM 88061

Baca, John, NMENV

From: Shannon Patrick <xannin2@yahoo.com>
Sent: Monday, September 24, 2018 1:41 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please reject this permit because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you,
Shannon Patrick, MA, M.Ed., MLS
Las Cruces NM

Baca, John, NMENV

From: Edward LeBlanc <el2@twenty15.com>
Sent: Monday, September 24, 2018 2:08 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

After reading about the proposed discharge permit 1840, I had to ask myself if we have lost our collective minds to even consider such a permit!

Coincidently just about a month ago, I showed my 17 year old son some information about the Berkeley Pit and Yankee Doodle tailings pond on the edge of the city of Butte, Montana. Apparently a lot of people thought that was a good idea at first. Now everybody sees that it was clearly a bad idea because it is a superfund site. It is so polluted that it kills birds unfortunate enough to landing on the water.

So that was in 1955, and apparently we have collectively still not learned enough from this and similar atrocities to stop doing this kind of thing. Someone will surely claim that the proposed discharge permit for the Copper Flat Mine is different, perhaps claiming that the "modern techniques" would not cause the same problems, but any such arguments would be naive.

What is being considered is to knowingly permit a future superfund site. This cannot be allowed! It is too dangerous.

With all due respect,
Sincerely,
Edward LeBlanc

531A Dolores St.
Santa Fe, NM
87501
505-471-9176

Baca, John, NMENV

From: Peter Roche <sunmtnsft@aol.com>
Sent: Monday, September 24, 2018 2:16 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to the issuing of the permit in that I think that the mine discharge tailing pond represents an unacceptable risk to the water in the Caballo Resevoir and the Rio Grande for decades to come. Also the open tailings pit will represent a hazard to wildlife for decades or more.

Peter Roche,
Santa Fe, NM

Baca, John, NMENV

From: Sharon Dogruel <dogruel@earthlink.net>
Sent: Monday, September 24, 2018 2:17 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I am very concerned about the permit referenced in that the discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam.

Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. I work with many residents in the Mesilla Valley and know how important water is in this area. Contaminated water would be disastrous for this region and beyond.

This permit will allow discharge from eleven years of mining and will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Granting this permit is wrong and New Mexicans will pay dearly for this mistake if it goes through. You have the authority to halt the discharge permit and prevent a serious environmental catastrophe. Please act responsibly.

Sincerely, Sharon Dogruel

Baca, John, NMENV

From: Susan A Christie <susan.christie1@icloud.com>
Sent: Monday, September 24, 2018 2:22 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

From Susan Christie & Bill Brown
Residents at 905 N Foch, T or C

We are registering our opposition to the Copper Flat Mine's Discharge Permit 1840.
We are totally against going thru this fight again but we are again registering out
total opposition to this permit.

Claims that this will produce continuous jobs are false. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

They will not clean up after themselves. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater. The threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

They require a damaging amount of water. In fact we believe that they are only after the water and do not care about the copper. It is likely that it will destroy environments up into Hillsboro and communities by lowering the water table.

This is our brief but important list of objections to this permit.
Thank you.

To: Butch Tongate, Cabinet Secretary
New Mexico Environment Department
Subject: In the Matter of Discharge Permit 1840 for Copper Flat Mine.

Docket No. 8WB-18-06(P)

Comments Of Charles P. Barrett
Homeowner: 10792 HWY 152, Hillsboro, NM

I own a home that is a scant three miles as the crow flies from the site of the New Mexico Copper Corporation's Copper Flat Mine. I oppose the granting of Discharge Permit 1840 due to the accumulation of serious unanswered questions and concerns that remain after examination of the Draft of the Discharge Permit.

I would like to put these into the record. I believe they are of sufficient scope and weight to require further investigation and substantiation before a valid Discharge Permit could be granted. They are as follows:

1. **The tailings pond liner might leak: interceptor system.**

The material for the liner has been known to leak in other instances of similar application over operational and post-operational time (which is seriously underestimated due to NMCC's undercapitalization and inaccurate projections and surety—see 5 below). If it does there is nothing underneath to catch the leakage. Does that mean the interceptor system has to be in place before the leakage is detected? Has NMED determined that NMCC has the water rights to pump water at that location at the base of the dam?

2. **The tailings pond liner might leak: sufficient groundwater.**

Has NMED seen the design of the interceptor system in sufficient detail to determine whether there is sufficient groundwater at that location to make the system work to capture all contamination?

3. **HDPE liner material degrades**

Is it true in the scientific literature that HDPE is considered not wholly impermeable to water but always leaks at least a little? For example black HDPE that I have used in my garden cracks and degrades in the sun and is clearly not impermeable. Has NMED evaluated this aspect of the liner's potential for leakage over decades?

4. **The Plan for the Tailing Storage Facility (TSF) is Contradictory and Inadequate**

The Draft states that the TSF will be reclaimed after operation by 6 years of "active evaporation" and then 21 years of "passive evaporation," and then covered up and seeded. During the first period, the "under-drain" (which is not an under drain) system is draining the TSF to a pond on the downstream side of the dam (i.e., near the highway) from where the water is pumped back up to the TSF. This is just a continuation of what has been happening during operation, that is, water seeps through the accumulated sediments of the tailings, goes into a layer of sand which has perforated pipes in it to collect and carry the water out under the dam to the drainage pond. It's analogous to a

big "French drain." When the drainage stops after 5 or 6 years, NMCC's plan is to turn off the electricity and sell the pumps and go into the "passive" phase, which only means that the muck in the TSF is left to dry on its own, for 20 years or so before they cover it with dirt and seed it. During the passive phase, the drainage pond will be replaced by a larger evaporation pond (which seems to suggest that water will still be seeping out the bottom of the tailings pond). This plan is unacceptable as it allows seepage in the "passive" phase that could contaminate groundwater.

5. The TSF Reclamation Raises Questions Due To NMCC's Inadequate Operational Finances

In the studies the NMCC presented to the NMED, they continue the assumption that mine operation is 11 years. Following this logically they then say about the TSF reclamation that it will be completed in "year 39." This is contradicted by both the history of the mine and the history of copper prices that would affect the mine which would strongly suggest that they are probably not going to be able to mine for 11 years continuously. NMCC projects that it needs $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 11 straight years of over $3.00 /lb. prices. So the chances are slight that we will see the TSF covered up in 39 years. If the mine takes 20 years to get the copper out, it will be 47 years that those of us who live or own property nearby, as is the case with this commentator, live with the threat of the TSF hanging over the whole Rio Grande valley. In fact, if some blip happens in Themac/NMCC's finances and the company goes bankrupt or if the company just shuts down after taking out the copper, are we left with a permanent contamination issue? After all, Themac/NMCC owns no other property: are they going to stay intact just to reclaim the tailings pond? So, the arrangements for a surety bond are crucial, and that is not yet in place but still being negotiated. NMED should not grant a Discharge Permit until the public gets a look at how we are to be protected.

6. Unanswered technical questions about closure.

How often will the monitoring wells that detect leakage from the TSF be checked after closure? This question arises from the fact that the duration of the reclamation of the TSF is longer than the operating life of the mine. If there is a leakage, an interceptor system has to be activated. Who will do that? Who will pay for that since the cost of these wells and pumps will not be part of the normal reclamation surety. The contamination of groundwater will trigger a fine of $10,000 per day, but that will be insufficient to pay for continuing operation of an interceptor system plus the cost of cleaning up the contamination. What if there is a major break in the HDPE liner or of the dam during active evaporation? What if during the passive phase, the evaporation pond overflows (note that it is near the highway)? That surface contamination will be undetected by the monitoring wells, and even if detected, the protective ring of interceptor wells will be inoperative since the electricity will have been turned off.

7. The Pitlake Reclamation Plan Contradicts Beneficial Use Standard

The question arises as to whether NMCC's fast-fill method of reclaiming the pitlake violates the New Mexico Constitution, wherein under (XVI, 3) the right to use water is limited to beneficial use. To use approximately 2,800 af of water to avoid having to

reclaim the steep pit walls or to avoid regulatory standards of pollution is not beneficial use of water. To create a large, chemically polluted body of water is not a beneficial use of water. To waste this much water – when the 2018 Draft New Mexico State Water Plan cites insufficiency of water supply as the major water problem the state faces and the 2016 Regional Water Plan for Socorro and Sierra Counties documents this insufficiency in coming years for Sierra County – will irrevocably harm the people's welfare and violate the public's interest, the water being permanently lost through evaporation. If the water were used to dilute polluted water so that it could be used beneficially, the filling of the pitlake might be allowed, but here the dilution is temporary, and eventually the pitlake will be polluted, as is the present pitlake.

How can this wasteful use of water be seen as part of the beneficial use of mining and have any lawful merit. First, the use is post-closure, after productive mining has ceased. Second, and more important, the usage is peripheral to actual productive use, a distinction defined in numerous court cases. In State ex rel. Martinez v. McDermett, 120 N.M. 327, § 13, the New Mexico Court of Appeals distinguishes productive agricultural use – meaning to grow crops - from peripheral uses such as using water to soften land to prepare it for plowing. The denial of peripheral uses of water as beneficial use has a solid base recognizable in New Mexico. See United States v. Alpine Land and Reservoir Co., 697 F. 2d 851, 854 (9th Circ. 1983) ("We do not deny or overlook the differences in water law among various western states. However on the point of what is beneficial use the law is 'general and without significant dissent.'") (citing 1 Waters and Water Rights § 19.2 (R. Clark ed., 1967).

Before proceeding to permit, the NMED should seek an opinion from the legal branch of the OSE as to the legality of wasting water in New Mexico.

Baca, John, NMENV

From: Chuck Barrett <amanecer.chuck@gmail.com>
Sent: Monday, September 24, 2018 2:30 PM
To: Baca, John, NMENV
Subject: Comment For Record of Hearing on DP 1840
Attachments: Discharge Permit 1840 Comment.docx

Dear Mr. Baca,

I hereby request that the attached comment document be added to the record of the hearing on DP 1840, Docket No. 8WB-18-06(P).

Thank You,
Charles P. Barrett

Baca, John, NMENV

From: Les Field <lesfield@unm.edu>
Sent: Monday, September 24, 2018 2:43 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern;

As a citizen of the state of New Mexico and the United States, concerned about the scarcity of water in our desert state, concerned about the health and well-being of the plants, animals and people who live here, and appreciative of the natural beauty which I want to see my grandchildren also enjoy, I strong;y oppose New Mexico Copper's plan to discharge 8 billion gallons of horribly contaminated water each year for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars. Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Sincerely,

Les W. Field

Les W. Field

Professor and Chair
Department of Anthropology
University of New Mexico
Albuquerque, NM 87131
Tel #: (505) 277-4524
email: lesfield@unm.edu

Baca, John, NMENV

From: Jan McCreary <mccrearyjan27@gmail.com>
Sent: Monday, September 24, 2018 2:56 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to allowing Copper Flat Mine to create a polluted pitlake and tailings pond because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This is unacceptable.

Sincerely,
Jan McCreary

Baca, John, NMENV

From: Daniel Richards <dprichards42@gmail.com>
Sent: Monday, September 24, 2018 4:25 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Attention Clerk John Baca,

This permit is totally unacceptable for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

I trust that the evidence for how destructive to people, wildlife and environment will make denying this permit a forgone conclusion. Please present my comment at the appropriate time in this hearing

Daniel Richards, 42 Chamisa Rd, Mimbres, NM 88049

Baca, John, NMENV

From: Kim Audette <kcaudette@yahoo.com>
Sent: Monday, September 24, 2018 4:47 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir;
I am against permitting the discharge from the Copper Mine in Sierra County

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

5. Keeping in mind the abysmal response of the NM Environmentl Department to the discharge of the Colorado gold mine into the San Juan River, which was a lot smaller at 9 million gallons than this copper pit mine waste pit is, it is impossible for New Mexico to both permit the mine and protect its waters. New Mexico is too incompetent to contain spills in the public interest. Therefore, New Mexico cannot permit pit mines anywhere near any aquifers as a matter of acting in the public interest.

Kim Audette kcaudette@yahoo.com 618 Van Patten 575-740-1988 Truth or Consequences, NM 87901

Subject: On the Hearing before the Secretary of the Environment

In the Matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. *WB-18-06(P)

Background: My name is Ben Lewis. I am a 23year resident of Hillsboro, NM. I am also the current President of the Hillsboro Mutual Domestic Water Consumers Association (HMDWCA). The HMDWCA is organized under the Sanitary Projects Act and has provided potable water to its' members since the early 1960's. The Association is also a litigant in the matter before the NM Court of Appeals regarding the claimed water rights of the Copper Flat Mine (NMCC). I have been authorized by the Association Board of Directors to summarize and convey our comments on the proposed Discharge Permit. We are requesting that our comments be added to the record of the hearing.

Comments: The Association opposes the granting of the requested permit to discharge polluted water from mining operations in to the ground water adjacent to the mine.

- We believe that declaring the proposed pit-lake to be an evaporative sink in order to avoid additional requirements in the reclamation process is risky. While there may be an equilibrium of inflows and evaporation at the current depth of the pit-lake; at the proposed final depth of approximately 250 feet the direction of the flow of water may reverse and become an outflow. This process could also be affected by climatic conditions. We do not believe the water in the lake will meet applicable quality standards and therefore becomes an ongoing risk to the environment. The pit lake will be a permanent feature in the environment with the need for monitoring for the foreseeable future. A safer and more environmentally responsible option for reclamation of the pitlake would be to fill it with waste rock at the end of production. Also, the proposed mine does not have sufficient water rights to execute their preferred reclamation option of doing a "rapid fill" of the pit.
- The current proposed design of the Tailing Storage Facility (TSF) utilizing a single layer of HDPE over a gravel bed is of particular concern. Since HDPE is designated as semipermeable we know it leaks. The gradual construction over time creates a concern of degradation of the material from ultraviolet light, perforation by equipment during construction and the inability to verify the effectiveness of the many joints. The Association recommends that NMCC be required by the Department to construct the TSF using a a clay, not gravel bed underneath two layers of HDPE with a drainage system between the layers.
- We are concerned that the monitoring and interception wells are too far apart and too few in numbers. The proposed quarterly monitoring is too infrequent to be adequate for the intended purpose. Based on our experience over the past 50 or so years that the monitoring wells be tested on a monthly basis. We are also concerned that NMCC does not have sufficient water rights to operate the monitoring and interception wells.
- We have been led to believe that the operating life of the proposed mine is approximately 11 years. What is not clear is this to be construed as 11 contiguous years or many years of intermittent operation. This is important because it has serious implications for monitoring

pollution and maintenance of the mine infrastructure. At what point, this process does the proposed permit become null and void? At what point is reclamation required to commence?

- The proposed mine is based on a marginal ore base and to a great extent on optimistic projections of the price of copper. NMCC has no real roots in New Mexico and no longterm commitment to Sierra County. It is not part of a larger more robust mining operator with a track record of keeping commitments and successfully operating and reclaiming the sites where they operate. It is very much a boutique operation without the resources to withstand the variability of operating environment and economic conditions.
- Finally, we believe that it is premature to consider this application. NMCC does not have the necessary water rights to execute their mining plan. Premature granting of permits can infer greater value to the property and perhaps lead to another transfer of ownership as I have seen several times over the years. It is also the conversion of government permits to private property which is not allowed under the New Mexico constitution.

Baca, John, NMENV

From: Ben Lewis <hillbro48@gmail.com>
Sent: Monday, September 24, 2018 6:12 PM
To: Baca, John, NMENV
Subject: Comments on Draft Discharge Permit Copper Flat Mine
Attachments: HMDWCA Comments on Discharge Permit for Copper Flat Mine.pdf

Please find attached the Association's comments on the above referenced permit. We would ask that our comments be added to the record of the Hearing.

Ben Lewis, President
Hillsboro MDWCA

Baca, John, NMENV

From: John Saridan <john.saridan@gmail.com>
Sent: Monday, September 24, 2018 6:28 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hearing Clerk John Baca,

If this permit is allowed for Copper Flat Mine near Hillsboro NM, it would allow New Mexico Copper Corp. to discharge 24 MGD of contaminated wastewater that can move directly or indirectly into the groundwater. The effluent discharge will be contained in a 600-acre pond behind a 2-mile sand dam. If a break occurs in the retaining dam or its synthetic liner system, it will cause catastrophic damage to surface water and groundwater to the east and south of the mine. It will endanger the Caballo lake and the Rio Grande river and therefore all municipal and agricultural water users in the Mesilla Valley. A threat to citizens, wildlife, agriculture and the economy will occur for many decades past closure, when the 24 billion gallons of wastewater is finally evaporated and the pond area buried. Remember this could have been used for drinking water!

The New Mexico Copper Flat Mine has only enough water rights to operate three months every year. This company projects an 11-year operation. Actually it will mine intermittently for decades. During that protracted period, Copper Flat Mine will remain not fit for use, the polluted pit lake and the pond will be a constant threat to New Mexico wildlife and New Mexico groundwater.

11 years of mining will depend upon approximately 23 billion gallons of water pumped from groundwater wells near the Rio Grande River. This pumping will impair the river's flow, enlarge New Mexico's liabilities in Texas' lawsuit challenging our state's management of the river, and can cost New Mexico taxpayers millions of dollars.

Best Regards,
John and Michele Saridan
3901 Sonoma Springs Ave Unit # 1211
Las Cruces, NM 88011

Baca, John, NMENV

From: KrisK <karpaul@mail.com>
Sent: Monday, September 24, 2018 6:44 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern: I would like to state my position as a New Mexico resident that I am totally against approving a discharge permit for the Copper Flat Mine outside Hillsboro. I believe the potential risk to the groundwater is unacceptable. Water is such a precious resource in our state and we need to protect both the quantity and quality of the life giving liquid we still have left. The 24 million gallons per day of contaminated wastewater that will be released if this permit is granted may one day escape into the surrounding groundwater causing pollution that will endanger both people and wildlife possibly for decades to come. It is simply not worth the risk. The permit must be denied!

Kris Karsteadt
3236 Highridge St
Las Cruces, NM

Sent from my iPad

Baca, John, NMENV

From: Chris Spigarelli <eldoradosf@yahoo.com>
Sent: Monday, September 24, 2018 6:52 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello Sir: This permit is a totally NOT environmentally safe or smart idea. As often happens, big business wants to steam roller over safety of the precious life-sustaining water, neglecting to see the results of this huge water waste & dumping the toxins back into the NM water supply. This will endanger the current humans & wildlife plus generations to come. Please take my comments into account...many NM citizens feel the same way, even though they might not comment.

Thank you sincerely, Chris Spigarelli from T or C

Sent from my iPad

Baca, John, NMENV

From: Melody Sears <tunessears@gmail.com>
Sent: Monday, September 24, 2018 8:55 PM
To: Baca, John, NMENV
Subject: For Secretary of the Environment Re: the Hearing on the Matter of Discharge Permit 1840 for Copper Flat Mine

I am a resident of Hillsboro, NM, unable to attend Hearing Meetings due to a previous commitment out of state. I served for four years on the Board of Hillsboro Mutual Domestic Water Consumers Association (HMDWCA) and am extremely concerned about pollution of groundwater from Copper Flat Mine operations if the Discharge Permit is approved by NMED. I currently oppose approval of New Mexico Copper Corporation's application based on the following:

1. The present pitlake is polluted and during NMCC's operation of the mine, should it be permitted to operate, the pitlake waters will also be contaminated. It is my understanding that the NM Copper Rule currently suspends the normal standards of allowable contamination while the mine is operating, but if the mine only operates intermittently, based on variable copper prices, then what will happen with the polluted pitlake water? Is NMCC then required to revert to normal standards of contamination in the pitlake water until mining activity resumes? If not, why not? And if mine operations do not resume within a reasonable time frame (6 months? 1 year?) then is NMCC required to begin remediation efforts? If not, why not?
2. The mine currently has been granted only enough water rights to operate for about 3 months of the year and is involved in an appeal regarding that decision. Nevertheless the discharge permit application is based on NMCC's calculations of discharge and contamination for a mine life of 11 continuous years of operation. NMED would be derelict in its duty if it issues a discharge permit until the appeal mentioned above has been decided.
3. If NMCC were to go into bankruptcy there should be measures in place before being granted a discharge permit by NMED requiring that a fully funded bond or some other surety be established to ensure that remediation of the pitlake and tailings pond will be done within a reasonable time frame (2 years?) despite abandonment of the mine or cessation of operations. Again, NMED would be derelict in its duty if it issues a discharge permit before the appeal mentioned above has been decided and it is clear whether or not NMCC will have enough water rights to operate fully each year for 11 years, which their discharge permit application calculations are based upon.
4. Finally, the existing tailings pond has no HDPE liner and has been leaking contamination into groundwater for the past 35 years. An interceptor system should be required of NMCC and put in place before they begin mining operations, rather than waiting for new monitoring wells to detect new contamination. This requirement must be based on the certainty that NMCC owns sufficient water rights to operate an interceptor system correctly sized for their 11 years of full-time operations.

Thank you for your attention to these concerns.

Sincerely,
Melody Sears
10792 Highway 152, Hillsboro NM 88042

Baca, John, NMENV

From: Adrienne Ross <ahlight@gmail.com>
Sent: Monday, September 24, 2018 9:26 PM
To: Baca, John, NMENV
Subject: "In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)."

Dear Mr. Baca,

I respectfully request that you deny Copper Flat Mine's discharge permit and protect our precious groundwater for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you for your consideration and cooperation on behalf of all New Mexicans.

Sincerely,
Adrienne Ross

Baca, John, NMENV

From: Miranda Roussel <mirandaraven@gmail.com>
Sent: Monday, September 24, 2018 9:53 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P).

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Please reject the permit. My family lives on Animas Creek and they use the ground water for drinking. Please don't let mining prospects threaten my family.
Thank you,
Miranda Roussel

Baca, John, NMENV

From: Barry Hatfield <barryhat@cybermesa.com>
Sent: Tuesday, September 25, 2018 12:39 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir,

This permit should be rejected.

New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pit-lake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater -- that once was drinking water -- is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

Thank you,

Barry Hatfield

Santa Fe NM
(505) 473-0695

Baca, John, NMENV

From: deb shekter <dtshekter@yahoo.com>
Sent: Tuesday, September 25, 2018 8:25 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please do not allow this permit for Copper Mining! Look at what happened in Butte, Montana - the Berkeley Pit!
Let's think about the long term effect this will have on our environment in New Mexico and Texas. By long term, I mean decades and decades from now. Please do not allow this to happen.

Respectfully submitted, Deborah Shekter

Baca, John, NMENV

From: Laverne S. Stinnett <dancingswanjewels@gmail.com>
Sent: Tuesday, September 25, 2018 12:25 PM
To: Baca, John, NMENV
Subject: [EXT] "In the matter of Copper Flats Mine discharge permit 1840, docket number 8WB-18-06 [P]"

To all who are involved with this project, I live on Animas Creek, located south of this mine. I live with 300+ year old Arizona Sycamores on this property. They are ancient, beautiful wise sentinels in the creek, their life much longer then ours...and I want them to live in good health on this creek for future generations to enjoy. They are NOT replaceable. These trees are a treasure worth far more then a mine which rips up the landscape and pollutes our water. I feel we have a moral responsibility to this Earth, our home to care for & preserve it. Let morals rule, NOT MONEY. I feel this whole thing is about greed and money. I am VERY VERY opposed to this mine being operational. Our water table here on Animas Creek is already somewhat polluted from the original mine operation. WHO is responsible for cleaning it up?? Empty promises ...why should we all believe it will be 'different' this time?? NO,NO,NO!

Laverne S Kennedy
395 Animas Creek Road
Caballo N.M.
575-649-3424

Baca, John, NMENV

From: Thomas Kindig <tokind@gmail.com>
Sent: Tuesday, September 25, 2018 1:14 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Sir,
The permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

One of New Mexico's most endangered resources is groundwater. As our region continues to experience dry conditions which deplete our surface water resources, it would be criminal to risk our groundwater resources in this fashion. Release of contaminated substances to our environment should be met with massive penalties - not permits.

Thanks,

Thomas
- We are as gods and have to get good at it. -Stewart Brand

Baca, John, NMENV

From: A.T. Cole <atandcinda@gmail.com>
Sent: Tuesday, September 25, 2018 2:50 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello:

This request ignores the reality of our times. There is a shortage of potable water and to allow this magnitude of dumping is unconscionable. Please say 'No."

A.T. & Lucinda Cole
Grant County Residents

"We are faced with the most colossal set of events in human history: *the catastrophic convergence* of poverty, violence and climate change." Christian Parenti

Baca, John, NMENV

From: Robert Johnson <rjwata@gmail.com>
Sent: Tuesday, September 25, 2018 11:07 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I'd like to voice my opposition to Copper Flat Mine's discharge permit 1840, for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Robert Johnson
Albuquerque, NM, USA

Baca, John, NMENV

From: Kathryn Albrecht <lapaz@zianet.com>
Sent: Wednesday, September 26, 2018 1:41 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please deny the Copper Flat discharge permit, due to inevitable surface and groundwater contamination it would engender. Thank you!

Kathy Albrecht

--
Kathryn Albrecht
San Antonio, NM

"Do not be daunted by the enormity of the world's grief.
Act justly now. Love mercy now. Walk humbly now.
You are not obligated to complete the work,
but neither are you free to abandon it." — The Talmud

Baca, John, NMENV

From: Kathryn Albrecht <lapaz@zianet.com>
Sent: Wednesday, September 26, 2018 1:47 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The pit size, well-drafting of water for the mining operation, and paucity of water in that watershed & region makes mining unfeasible in its entirety. Thank you,

--
Kathryn Albrecht
San Antonio, NM

"Do not be daunted by the enormity of the world's grief.
Act justly now. Love mercy now. Walk humbly now.
You are not obligated to complete the work,
but neither are you free to abandon it." — The Talmud

Baca, John, NMENV

From: Brittany Fallon <blfallon@gmail.com>
Sent: Wednesday, September 26, 2018 2:26 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am a voting citizen and I would like this permit to be rejected. Thank you.

Baca, John, NMENV

From: pgnm <pgnm@comcast.net>
Sent: Wednesday, September 26, 2018 8:51 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Stop Copper Flat Mine.
Pat Duncan.
Los Lunas NM

Sent from my Verizon, Samsung Galaxy smartphone

Baca, John, NMENV

From: Debora Nicoll <4ncx123@gmail.com>
Sent: Thursday, September 27, 2018 4:14 PM
To: Baca, John, NMENV
Subject: [EXT] DP 1840, Docket 8WB-18-06(P), copper flat mine

Dear Secretary of Environment,

I am Debora Nicoll, (105 Caje Trail Rd, Hillsboro NM 88042) and am writing regarding the discharge permit 1840 for copper flat mine in Hillsboro NM, Docket No. 8WB-18-06(P). I am a retired biomedical researcher with a BS in chemistry and a PhD in biology.

I oppose your granting this permit. The mine owners seem very vague about how they propose to deal with the "pit lake" after mining. In their environmental impact statement, they have referred to the current pit lake as an environmental sink with water inputs coming from groundwater and precipitation and with evaporation exceeding those inputs. This, of course means, that any contaminants in the pit lake are becoming more concentrated with time. The mine company also mentioned that the current pit lake already has displayed elevated levels of a number of metals including aluminum, lead, cadmium and zinc. The mining company states that because of this, the pit mine does not meet standards for uses in warm water aquatic habitat, livestock watering or for wild life habitat.

The mining plan includes pumping water from the pit lake and using it on the walls of the mine to control dust. I understand this to mean that they will pump the contaminated water from the bottom of the pit and spray it on the roads leading down into the mine. That water will pick up additional contaminants while draining back to the bottom of the pit and those contaminants will become more concentrated with time.

The pit lake is in contact with groundwater as evidenced by the input of groundwater to the pit lake. Since this is so, that also means that the contaminants in the pit lake can diffuse into the ground water and flow, most likely into the direction of Lake Caballo and the Rio Grande, or, perhaps more alarmingly, into the wells, seeps and springs that are used by local human and non human residents.

It seems that the best way to deal with the pit lake after mining would be to backfill the pit and bring the area back up to contour. This is exactly what the mine company says it is <u>not</u> doing. Instead, they propose to allow the lake to fill and to plant trees and other landscaping and make it accessible to wildlife. This sounds like a perfect recipe for ridding the area of all the local fauna.

Given all these points, I must highly encourage you not to approve discharge permit 1840, docket no. 8WB-18-06(P) for the copper flat mine.

Thank you
Debora Nicoll

Baca, John, NMENV

From: Peter Van Metre <pcvanmet@gmail.com>
Sent: Thursday, September 27, 2018 4:41 PM
To: Baca, John, NMENV; bjmahler59@gmail.com
Subject: [EXT] Comment on Discharge Permit 1840 for Copper Flat Min
Attachments: Copper Flats comment from Van Metre & Mahler.docx

Dear Mr. Baca,

Please find the attached comment on the subject Discharge Permit request.

Regards,
Peter Van Metre and Barbara Mahler

On the Hearing before the Secretary of Environment in the matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. 8WB-18-06(P)

Attention: Hearing Clerk John Baca

Dear Mr. Baca,

We are writing to express our concern about the proposed reopening of the Copper Flat Mine, in particular regarding the Discharge Permit (public notice #2, 2/2/2018, DP#1840). As residents of Kingston, NM, we live only about 10 miles from the mine and have an apple orchard and ground- and surface-water right, so the health of the local environment and the availability and quality of local water resources are important to us. As professional hydrologists, water resources in general are important to us as well. Although we have limited familarity with local hydrogeology in the Copper Flat Mine area, one of us (Van Metre) has 38 years of experience in water quality and sediment chemistry, a Masters Degree in Hydrology from the Univ. of Arizona, and a PhD in Geology from the Univ. of Rouen, France. The other (Mahler) has 25 years of experience in aqueous geochemistry and hydrogeology, with a Masters and PhD in hydrogeology from the Univ. of Texas.

The discharge permit request states that "New Mexico Copper Corporation, proposes to discharge up to 25,264,000 gallons per day (25 MGD) of mine tailings, process water, impacted stormwater, and domestic wastewater to a lined tailing impoundment. ... Potential contaminants from this type of discharge include sulfate, nitrate, total dissolved solids, and metals." We think there are important questions to be answered regarding this request. These include:

1. 25 MGD translates to filling the existing tailings impoundment, about 1 square kilometer in area, with 120 feet thickness of water and tailings over the course of a year. What portion of the 25 MGD is water that must be evaporated to avoid eventual outflows? Annual evaporation is expected to remove only about 6 feet of water. What becomes of the remaining 114 feet of water and tailings? Or over 5 years, 570 feet of water and tailings? The existing tailings impoundment is about 150 feet above the land surface (per the 1996 USGS quadrangle map); how much does NMCC propose to increase the size of the impoundment to accommodate all this material for how many years of mining? We are unclear on how NMCC is proposing to handle the level of discharge requested in the permit.
2. What is the proposed source of the water in the 25 MGD that will be discharged? If a substantial portion of this water will be pumped from the pit as part of the dewatering operations, how will the resulting change in water level affect the groundwater flow system in the area? What will the quality of that water be? The report produced by SRK Consulting (SRK Project Number 19100003; 2018) cites elevated concentrations of copper, sulfate, chloride, TDS, manganese, cobalt, fluoride, sodium, and potassium in pit lake water as a result of periodic Acid Wall Seep (AWS) events. For example, Figure 1.9 in that report shows a maximum copper concentration in the pit lake of 26 mg/L in 2013; the USEPA Maximum Contaminant Level for copper for drinking water is 1.3 mg/L.

We have additional concerns and questions about contradictory information on the hydrologic setting of the mine in the environmental engineering reports that are the foundation of the mining plans and the

Discharge Permit. Two documents from the public record describe the geology and hydrology of the Copper Flats mine site and, specifically, the pit lake. These documents are inconsistent—which one is incorrect? The letter from Shoemaker and Associates to Ms Katie Emmer, dated June 25, 2015, responding to questions raised about the rapid fill scenario, includes and relies heavily on the figure reproduced below (Figure 1). This data and modeling exercise indicates that the groundwater level in the pit will have stabilized at about 4900 feet (amsl) 100 y after mining and a difference in groundwater level from the pit lake to the eastern local maximum of 200-250 feet, which would drive groundwater flow in the direction of the pit. The authors conclude that more than ***20 feet*** of rain on the pit and surrounding drainage area to reverse that gradient and cause pit water to flow into the regional groundwater system.

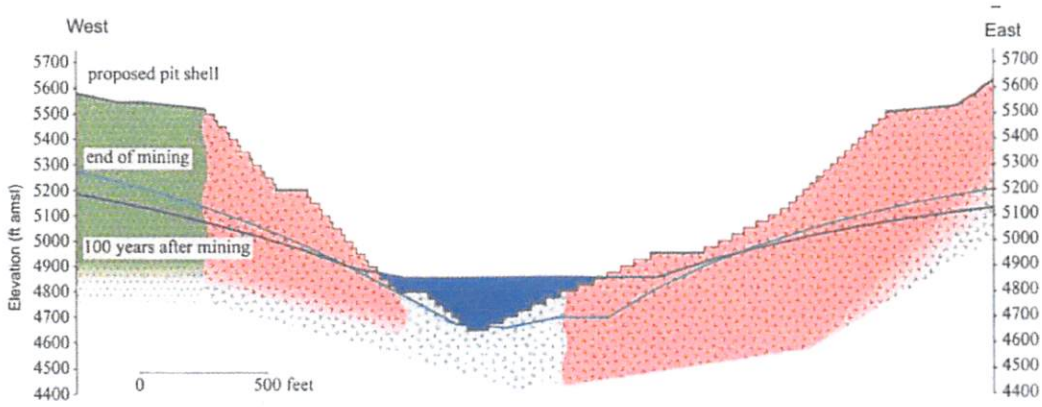
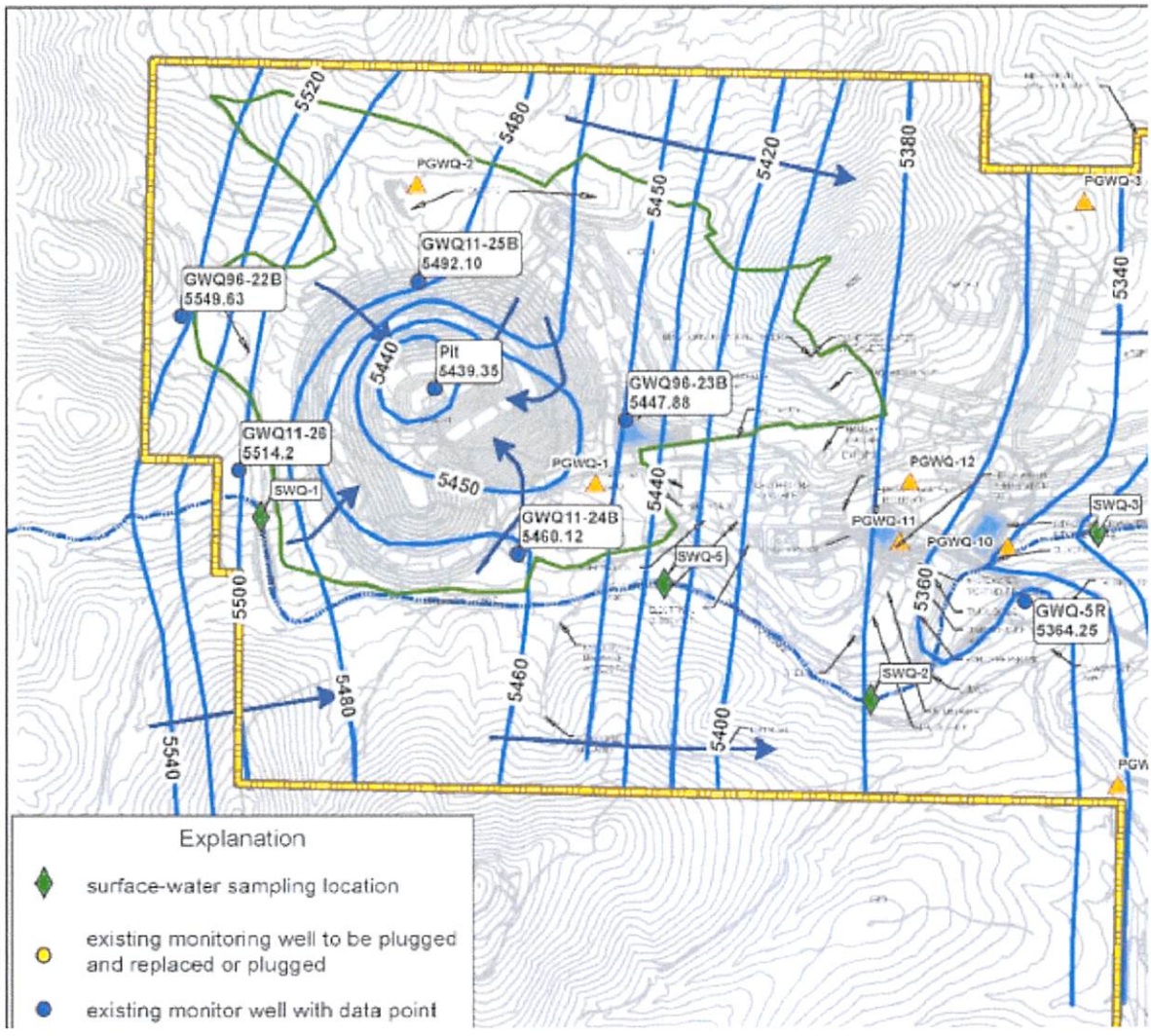


Figure 1. West-to-east profile of post-mining water levels across the open pit.

Figure 1 indicates that the highest water level down-gradient (east) of the pit is always above elevation 5,100 ft amsl. The long-term pit water elevation fluctuates near elevation 4,850 ft amsl, with maximum water elevation of 4,900 ft amsl occurring at the end of rapid fill. To create a flow-through system, water level in the pit would have to exceed elevation 5,100 ft amsl.

However, a figure in NMCC report DP-1840, dated 2018, (Figure 2, reproduced over the mine pit below) shows the current potentiometric surface (groundwater level) at the mine site in map view based on monitoring wells. In this document, the groundwater level at the center of the pit is 5440 feet (amsl), whereas in the Shoemaker and Associates letter the groundwater level in the pit is given as 4900 feet, a different of more than 500 feet. Why would the pit water level stabilize more than 500 feet lower after the next round of mining compared to where it is now? In the NMCC report, the nearest monitoring well to the east, regionally down-gradient, is 5448 feet—just 8 feet above the level in the pit. This indicates that only a small change in water level in the pit relative to the surrounding groundwater level, less than 10 feet, would reverse flow direction, compared to the change of 200-250 feet cited by Shoemaker. The very large inconsistencies between the modeling results presented in the Shoemaker letter and the current groundwater levels raise crucial questions regarding the reliability of the hydrologic assessments that underlie this permit request.

Figure 2 – Ground and Surface Wa



Sincerely,
Dr. Peter Van Metre
Dr. Barbara Mahler
35 Kingston Main Street
Hillsboro, NM 88042

FREEPORT-MCMORAN

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

HANS TOWNSEND. PRESIDENT & CHAMBER
DESERT VIEW INN 906 N. DATE

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have.
So why do so many throw their hands up in horror and try to tell us it will be the apocolypse for water, nature and life as these people know it if Copper Flat were to be allowed to proceed?
It really seems that some people think this is the first mine ever to come to Sierra County, when we've had mining here for many, many hundreds of years, and it's still a beautiful place to live.

It's time that our citizens realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community.
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting real opportunities to improve our economy slip away.
Many make the claim that the mine would take away water that we can't afford, but I don't hear the resistance to new pecan orchards that use multiple times more water per acreage, and don't have much economic impact for the citizens.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer in the way of employment, so most of our young people move away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and with no thought for the families that struggle to survive, living a long way below the poverty line. Many of these families have lived in Sierra County for generations.
I hear the claim that this is a retirement community, but that is an assumption that

is based on the present preponderence of older folks, not on the way the community was built.

This city was formed by workers, workers from the dam, workers who brought their families to live and grow here. We still have families, we still build schools for their children.

The reason for the abundance of older people is that we have a generation gap, a gap caused by the migration of young adults leaving to find a place where they can earn a better living. We don't just lose those young adults, we lose their children, and their childrens children, and it leaves a community with the too young to leave, and older adults who don't want or need to leave. Yes, retirees move in, but the percentage would be much smaller if we kept our young adults, and of course their children who would then grow up and restart the cycle.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.

That's partly because Sierra County is so very poor, among the poorest counties in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Paul Tooley
916 Yucca Street
Truth or Consequences, NM 87901
(575) 740-1640

I was born, raised, and a lifelong resident of Sierra County. I served on the Truth or Consequences Municipal School Board for 16 years. I am currently on the Truth or Consequences Fire Department and have served for 32 years and currently hold the position of Fire Chief. I am employed by Sierra County as the Emergency Services Administrator. As a first responder I understand the need for safety regulations, inspections and education. I believe THEMAC Resource Group has done everything possible to meet the requirements of the New Mexico Environment Department Groundwater Quality Bureau. I support the position of the Copper Flat Mine Project and the issuing of their Groundwater Protection Discharge Permit.

Dear State Engineer office

I hope you would support the THEMAC's application to open the copper mine at Copper Flats in Sierra County N.M. I support THEMAC because they have taken every present environmental precaution so far that has been brought up to this point in time. I know a lot about environment construction because I worked 8 years as a survey engineer, and 30 years in maintenance.

Sierra County also needs a break to improve our economy, and to give our local people a chance to have an opportunity and a quality learning experience. If you haven't gone to one of THEMAC's meetings you should go for a quality learning experience.

You will also hear from the Citizens Against Virtually Everything (CAVE) groupe and senior citizens who don't want this mine reopened. They have a lot of reasons not to open this mine because they are afraid to look at the real facts, and the fact that they don't want a new group of young people helping to give our county anew and productive start. I would appreciate that you would sign the necessary documents to open the mine at CopperFlats so that we can have an opportunity to revitalize our people and our economy, and stabilize our county.

Sincerely,

Ted Kuzdrowski
PO Box 1445
Elephant Butte, N.M.87935
1-4-17
Email tedletha105@gmail.com

Baca, John, NMENV

From: Bruce Cosper <brcbruce@outlook.com>
Sent: Friday, September 28, 2018 5:34 AM
To: Baca, John, NMENV
Subject: [EXT] Cooper Flat discharge permit

To Whom it may concern:

My name is Bruce Cosper and I am a resident of Hillsboro N.M. My family has lived here for four generations. My son and business partner Asa Cosper, who also lives here own and operate a construction company, Black Range Const. We are in support of the Cooper Flat Mine. I was living here when Cooper Flat opened and worked out at the mine for Quintana. At the time of the mine operating there was positive influence on the town of Hillsboro and TorC. Young families were able to live here and have decent work that payed well. The school bus that served Hillsboro carried a number of kids instead of the one or two that ride it now. Even when the mine was working at full capacity you would never know it on the streets of Hillsboro. I never heard of anybody's well being effected by the mine, I know for a fact that our well never fell below it's original static level. My uncle, Harvey Chatfield whose family homesteaded there Ranch in Animas creek never had any well problems that resulted from the wells that the mine pumped out of, if they did effect him, and his ranch you would have heard about it from him.
I trust that the EPA and other agency's of the state will do there job, as well as Cooper Flat Mine to keep our environment safe and returned to a more natural state whenever the mine closes. What I am worried about is that some of the people that have been apposing the mines opening. Some have only lived here a short time, and don't know the history of the area some only live here part time. Many of these folk's will sell there homes and move on to somewhere else after a few years of being here weather the mine opens or not. They are retired and really don't care what the economics of the county are in and what this mine can do for young families, for our schools and small business that currently struggle making ends meet. I believe that the positive economics will carry on for years to come and will out way any of the negative that might occur.
I want to Thank you for your consideration and time that you are taking in approving the Cooper Flat mine discharge permit and look forward towards your continuing efforts in making this operation a success.

Thanks Again,
Bruce Cosper
Black Range Const.
Hillsboro N.M.

Sent from Mail for Windows 10

Baca, John, NMENV

From: CEG <ceg@plazarealtynm.com>
Sent: Friday, September 28, 2018 7:35 AM
To: Baca, John, NMENV
Subject: [EXT] copper flat discharge permit

Mr. Baca,

Thank you for the opportunity to comment on the above referenced item. I was not able to address the group in person and am grateful that I may include my position on the record. And, while I am the President of the Sierra County Board of REALTORS, I speak to you in my personal behalf, and not in behalf of the Board of REALTORS.

There will be a great deal of prepared data on both sides that will be presented to you I am sure, however, as I understand the purpose of the public hearing being held in Truth or Consequences, NM is to determine the will of the local public and the impact upon them.

Sierra County is one of the poorest counties in one of the poorest states in the Nation, we can go into many directions as to why, however, to focus on Sierra County, with your approval of the permit, and the subsequent approval of the mining operation, you will afford Sierra County to begin establishing an economic base that will allow for the populace of the county to reap the benefits for generations.

Yes, it is anticipated that the mine will produce for around 12 years, however, there will be time before production begins, and time after production ends where individuals will be employed. It will also allow for additional commerce to consider the area, and may introduce entities to our area that have never considered, or, have previously dismissed our community.

Currently there is only one approved subdivision, with infrastructure, in our county where any building is occurring, and there has only been one home built in that subdivision in the last five years.

I ask that you approve the Copper Flat Discharge Permit, it will be a great blessing to our people, homes and community.

Of course, should you have any questions of me please contact me.

Regards,

C. EARL GREER
PLAZA REALTY
P.O.BOX 985 ELEPHANT BUTTE NM 87935
575.744.5140 FAX 575.744.5121 CELL 505.350.1155
www.plazarealtynm.com
twitter cegreer skype cegreer

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:02 AM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

My husband and I are residents of Sierra County, NM. We retired here three years ago and own both residential and commercial property in Truth or Consequences, NM. We have lived in the Southwest, including AZ, for over forty years, and also own property in Catron County, NM. We love the Southwest and Southern New Mexico in particular.

We pay close attention to economic, water resource, and environmental issues in the U.S. and the Southwest. This week (Sep 24-28), we attended and listened intently to the NMED hearings held in T or C. **We remain opposed to NM Copper Corp. (Themac Resource Group) reopening the Copper Flat Mine in Hillsboro, NM and the issuance of Discharge Permit 1840. This project would have profound long-term detrimental consequences to the water, environment, and people of New Mexico.**

1. First and foremost, 11 years of mining would use 23 billion gallons of water pumped from wells near the Rio Grande River. Unlike agricultural, municipal, or domestic wastewater, this water will not be returned to the soil to be reused. Municipal and agricultural water users in Southern NM, need every drop of water that exists. As you know, ground water is a significant problem throughout the Southwest and particularly in Southern New Mexico. With good reason, New Mexico is currently being sued by Texas regarding excessive agricultural pumping of ground water that feeds the Rio Grande. Independent of the Copper Flat Mine, this has been a huge issue that will be at the Supreme Court within a few short years. This lawsuit itself is clear evidence that NEW MEXICO DOES NOT HAVE GROUND WATER TO SPARE.

2. Approval of this permit creates a significant threat to Southern New Mexico. It would endanger the Caballo Reservoir and the Rio Grande River and all municipal and agricultural water users in the Mesilla Valley. According to this permit application, 113 million tons of discharge would be contained in a 600 acre tailing pond behind a 2 mile sand dam with a 22 acre pit lake of polluted water at the bottom. Even a minor mishap in the dam or the synthetic liner would cause catastrophic damage to surface and ground water, contaminating what little water we have, endangering all human, plant, and animal life. This would mean decades of constant threat to New Mexico groundwater, wildlife, and economic development.

3. The economic benefit of reopening Copper Flat Mine will not be nearly as great as city county, and state officials and business people hope. New Mexico Copper Corp. has only enough water rights to operate three months per year. This means the environmental and economic threat would continue during decades of intermittent mining. The company says it will employ abut 270 employees. But this relatively low number of part-time low wage jobs are of questionable benefit. Based on the NM Copper Corporation's water agreement with the Jicarilla Apache Reservation, their people would have employment preference. Regardless of where employees originate from or settle, the Copper Flat Mine is at least a 30-60 minute one-way drive from most residential communities. Such part-time intermittent employment would be minimally beneficial to Southern New Mexico. In fact, it is likely the mine would not attract permanent residents but, instead, to result in an increased transient population. Most of the economic benefit of this mine would be to Australian-based CEO's and shareholders that are not even NM residents.

To increase NM Tax revenue, it would be of greater long-term benefit to create policies that would attract sustainable energy companies that will offer long-term revenue and resident employment. The cost/benefit ratio of the Copper Flat Mine "opportunity" is way too high. Given very significant threat to the water, environment, and economy and minimal

economic benefit to the people of Souther New Mexico, we urge the NM Environment Department to disapprove Discharge Permit 1840.

We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:09 AM
To: Baca, John, NMENV
Subject: [EXT] Fwd: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Correction to Subject

---------- Forwarded message ---------
From: **Jaswant Khalsa** <jaswantkhalsa@gmail.com>
Date: Fri, Sep 28, 2018 at 11:02 AM
Subject: In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)
To: <john.baca2@state.nm.us>

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

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We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Dan Maxwell <swex@cybermesa.com>
Sent: Friday, September 28, 2018 1:34 PM
To: Baca, John, NMENV; Jeffrey Smith
Subject: [EXT] comments on Copper Flat discharge permit

I have worked in New Mexico as a mining engineer for 43 years, and during my career, I have witnessed the mining industry shrink at an alarming rate. Along with this demise goes the tax base of our rural communities to the point of near extinction for some; just ask the folks in Grant, Hidalgo, Luna, Cibola, McKinley, San Juan, Colfax, Taos and Eddy Counties.

As an alternative to this "old" resource economy, the green community has re-packaged another old idea in its buzz phrase of a "recreation economy". But the jobs in this "Tourism" sector are largely seasonal, low skill and low pay, which leads to further strain on public coffers to support workers during off-season periods of unemployment. With Elephant Butte Lake as an example, long-time Sierra County residents know this all too well; many in the community survive off one assistance program or another during slow periods.

As a major producer, Copper Flat would go a long way towards improving the economy of Sierra County with long-term, skilled, high-paying jobs, and beyond the planned 10-15 year mine life, proposed operations may reveal additional resources for the future. Loud, emotional hyperbole is difficult for the Department to ignore, but from my knowledge of the contents of NMCC's discharge permit application, I support NMED's approval of the Plan on its technical merits.

If you have questions, please email the address above, or call me at 575-537-9594.

Sincerely, Dan Maxwell.

Baca, John, NMENV

From: Bill Bussmann <bussmann@zianet.com>
Sent: Friday, September 28, 2018 4:06 PM
To: Baca, John, NMENV
Subject: [EXT] Copper Flat Mine Discharge Permit 1840 comment

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Bill Bussmann. I live on Animas Creek near the proposed mine and I would like to share my concerns with you.

At this time it makes sense to delay a decision on the discharge permit until such a time as Themac can show they have legitimate water rights for the entire operation. Ongoing litigation over alleged water rights in the lower Rio Grande basin demonstrates the inappropriateness of the NMED issuing a permit for discharge from an operation which has only enough water rights to run 83 days a year, but all the details of the discharge and possible contamination of ground water are calculated using a 12 month a year/11 year life of mine scenario. Sort of like buying the variety dozen pack of Trojans when you don't even know any girls! They should resume the permitting process when they have obtained sufficient legal water rights.

Chief operating officer Jeff Smith mentioned that Tulla was the Mahoney family trust that was going to fully finance the installation and initial operation of the mine, taking all the risk, and taking up the slack when copper prices were down, to ensure a full, non-stop, 11 year operation. Two years ago they agreed that they would discuss the terms on which Chinese mining company Yunnan Haliliya might be able to increase their interest in NMCC to 51%, after an initial 6% investment. The deal fell through, but demonstrates they are really trying to get all the permitting paperwork in order so they can pass off this used car of a mine or, at the very least, sell most of the risk.

Since NMCC has a proven track record of NO reclamations and NO financial assurances in their past mining history, I urge you to proceed with utmost care to ensure that the people of New Mexico are not stuck with the cleanup bill for this toxic rockpile.

Hydrogeologically yours

bill bussmann

hc31 box89

Caballo NM 87931

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Subject: FW: [EXT] Copper Flat permit

John,

For the Copper Flat Hearing record

From: shdooley@aol.com <shdooley@aol.com>
Sent: Thursday, September 27, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: [EXT] Copper Flat permit

The New Mexico Environment Department is holding a public hearing on the discharge permit for the Copper Flat mine in Hillsboro.
The hearing will consider a proposed groundwater discharge permit prepared by the Environment Department in response to a permit application submitted by New Mexico Copper Corporation for discharges from the proposed Copper Flat Mine. The draft permit authorizes the mine operator to discharge 22.3 million gallons per day of tailings, mining impacted and domestic wastewater that could contain contaminants and toxic pollutants above state standards.

The draft discharge permit for the Copper Flat Mine is inadequate. It should be denied, but *at a minimum the permit needs to be re-written with conditions* for the following reasons:

- **Incomplete Characterization** – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. ***The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.***

- **State Water Quality Standards Must Apply** – The draft permit assumes that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. ***The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.***

- **Groundwater Monitoring Is Inadequate** – Even though NMED has added two additional groundwater monitoring wells, the total number of wells and their location are still inadequate. ***The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and/or the tailings storage facility.***

- **Hazard to Public Health and Undue Risk to Property and Public Safety**

- The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.
- The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

- **Streams Important for Wildlife, Including Endangered Species**– Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

- **Financial Assurance**– The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the company default, pushing the costs of cleanup onto taxpayers.

Susanne Hoffman-Dooley
Santa Fe, NM
shdooley@aol.com

Baca, John, NMENV

From: Vollbrecht, Kurt, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Cc: 'Allyson Siwik' (grip@gilaresources.info); Reid, Brad, NMENV
Subject: FW: [EXT] Copper Flat DP-1840 - GRIP Public Comments
Attachments: GRIP-CopperFlat-DP-1840Hearing.pdf

Hi John,

Please find attached comments from GRIP regarding the draft DP-1840 proceeding.

Thanks Allyson.

Kurt Vollbrecht, Program Manager
Mining Environmental Compliance Section
Ground Water Quality Bureau
New Mexico Environment Department
(505) 827-0195

From: GRIP <grip@gilaresources.info>
Sent: Friday, September 28, 2018 4:21 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Cc: Vollbrecht, Kurt, NMENV <kurt.vollbrecht@state.nm.us>
Subject: [EXT] Copper Flat DP-1840 - GRIP Public Comments

Good afternoon, Brad:

Please find attached public comments from GRIP on the Copper Flat mine DP-1840. I was unable to attend the hearing this week in TorC given a family health emergency.

Thank you for your consideration of our comments.

Allyson Siwik, Executive Director
Gila Resources Information Project
305A North Cooper St.
Silver City, NM 88061
575.538.8078 office/fax
Www.gilaresources.info

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:36 PM
To: Baca, John, NMENV
Subject: FW: Docket No. 8WB-18-06(P)

Another one....

From: Rick Burns <animasrick@gilanet.com>
Sent: Monday, September 24, 2018 11:08 AM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Docket No. 8WB-18-06(P)

Hearing Clerk, John Baca

Docket No. 8WB-18-06(P)

My name is Rick Burns, I live in Animas Creek canyon north of the copper flat well field, and would like this to be included into the public comments re: this discharge permit.

Here are a list of things i find lacking in the current wording of the permit application:

1. Incomplete Characterization – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.

2. State Water Quality Standards Must Apply – NMCC is claiming that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

3. Groundwater Monitoring Is Inadequate – Even though NMED has added 2 additional groundwater monitoring wells, the total number of wells and their location is still inadequate. The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and the tailings storage facility.

4. Hazard to Public Health and Undue Risk to Property and Public Safety

o The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.

o The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

5. Streams Important for Wildlife, Including Endangered Species – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

6. Financial Assurance – The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation. This was not satisfactorily done during the permitting for Quintana.

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:38 PM
To: Baca, John, NMENV
Subject: FW: Public Commentary Flat Copper Mine

From: Gordon Bryson <gordonbryson@yahoo.com>
Sent: Tuesday, September 18, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Public Commentary Flat Copper Mine

Dear Mr. Reid,

I am not a citizen of the state of New Mexico but have lived all my life in East Texas. My opportunities to visit New Mexico have been limited but the several times I've been in the northeastern part of your state have been most enjoyable and always create a desire to return again soon.

My reason for writing this is to register my concern for the proposed Flat Copper Mine and its probable impact on the beautiful streams and natural habitat of a vast part of New Mexico. Not only that immediate area, but a wide watershed area that ultimately impacts the State of Texas via the Rio Grande River. The Animas River incident that happened in the past few years should make all aware of the potential ecological dangers posed by commercial enterprises, especially when foreign corporations who have little concern for our country are permitted to operate here.

As an avid fly fisherman, and father and grandfather to two more generations of active fly fishers. I am deeply concerned about the effects of this project on the fine trout fishing found in the pristine streams of New Mexico.
While not a hunter, I have many friends in Texas who hunt there and the impact on the wildlife is another major issue. People from all parts of Texas visit your state for fishing, camping, hunting, hiking, shopping and other pastimes that generate substantial financial gains for your business people and the state of New Mexico.

Please do not permit this project to proceed in its present format, and only consider acceptance of redefined plans if they are acceptable to all affected environmental entities.

Gordon Bryson
2205 Thornwood
Tyler, TX 75703
903.520.2766
gordonbryson@yahoo.com

Lone Star Fly Fishers on Facebook
Lone Star Fly Fishers (LSFF Website)

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:41 PM
To: Baca, John, NMENV
Subject: FW: New Mexico Copper Flat Mining -horrid idea

From: Fiona Van Reisen <fiona@fionavanreisen.com>
Sent: Sunday, September 16, 2018 3:34 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: New Mexico Copper Flat Mining -horrid idea

Mr Reid,

Please do not go to your grave knowingly allowing this wrong to the environment. It's a lose lose and there's no coming back.

Got a conscience? It will hurt many people as well as ruining the landscape.

Please consider yourself as able to stop a wrong.

Fiona van Reisen

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:42 PM
To: Baca, John, NMENV
Subject: FW: Copper Flat Mine
Attachments: copper flat mine.docx

From: Deborah Brandt <debjbrandt@me.com>
Sent: Thursday, September 13, 2018 2:10 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Copper Flat Mine

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

The draft proposal for the Copper Flat Mine should be denied for a number of reasons. There is inadequate characterization of the bedrock. Mine pollutants would probably not be adequately contained to prevent groundwater pollution.

Water quality standards are not relevantly addressed, and the proposed groundwater monitoring wells are inadequate.

The discharge permit, authorizing up to 25.3 million gallons per day of potentially polluted wastewater is wholly unacceptable. The impact on streams, humans, wildlife and endangered species could be seriously affected by contamination; even the potential risk is unacceptable.

The amount of water needed for the mines use is staggering to even consider in our arid climate. Pumping our precious water resources would adversely drain and damage our ecosystem, local streams, and the Rio Grande. Not acceptable.

NMCC is not a trustworthy steward. They have been cited for numerous violations.

There is no guarantee that the mine would meet the Water Quality Act, and in this time of loosening environmental regulations, I do not trust that any serious enforcement would occur if NMCC failed to comply.

I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

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September 13, 2018

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I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

From: Cathy Knight <knight.cathy30@gmail.com>
Sent: Friday, September 28, 2018 4:59 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am against the Copper Flat Mine's request because

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

New Mexico does not need anymore bad environmental decisions. I am seeing plenty of them throughout our state. We should be conserving our waters not wasting and poluting them. I grew up in Silver City and had many drives through the beautiful Black Range in route to T or C for weekends at Elephant Butte. Please choose to protect our lands.

Cathy Knight
202 S. Lea Ave.
Roswell, NM 88203

Baca, John, NMENV

From: Robbin Brodsky <robbinbrodsky@gmail.com>
Sent: Tuesday, September 18, 2018 3:06 PM
To: Baca, John, NMENV
Subject: Comments on the hearing before the Secretary of Environment

Concerning discharge permit #1840 for Copper Flat Mine, Docket #8WB-18-06 (P)
I oppose granting this permit. My name is Joyce Robbin Brodsky. I am a resident of Hillsboro, New Mexico and a member of the National Audubon Society, New Mexico Wild, and the National Wildlife Federation. Themac's plans to mine copper and other ores using a pit mine and construct a tailings containment pond that will cover approximately 1 square mile will appear to our migrating bird populations as a welcoming stopover. When in fact, the waters would most likely kill these birds with the pollutants as in what happened at a copper mine outside of Butte, Montana when a flock of migrating geese landed in pit waters and died. Necropsies showed their insides were lined with burns and festering sores from exposure to high concentrations of copper, cadmium, and arsenic. Then there is the 4-legged wildlife such as deer, elk, bear, mountain lion, javelina that will see the water in this high desert environment very inviting. It does not make sense that an individual in Australia will profit from the loss of our wildlife. Please keep our state's vulnerable wildlife in mind when considering your decision.

GILA RESOURCES INFORMATION PROJECT

20 Years of Promoting Healthy Communities by Protecting Our Environment

September 28, 2018

Brad Reid, Permit Lead
New Mexico Environment Department
Ground Water Quality Bureau
1190 South St. Francis Dr.
PO Box 5469
Santa Fe, NM. 87502

Via e-mail: brad.reid@state.nm.us

RE: Public Comment on Copper Flat Mine Discharge Permit (DP-1840)

Dear Mr. Reid:

I am submitting the following public comments on behalf of the Gila Resources Information Project (GRIP) regarding the Copper Flat Mine Discharge Permit (DP-1840). GRIP was unable to attend the public hearing in Truth or Consequences and provide oral comments. I am therefore submitting them in writing.

GRIP is very concerned that the draft discharge permit DP-1840 will not adequately protect surface and groundwater quality in the vicinity of the Copper Flat Mine. We believe the draft permit should be denied or re-written with appropriate conditions to protect water resources.

- **Require full characterization of bedrock underneath the mine site** – The mine operator has not conducted an adequate characterization of the bedrock underneath the mine. It is unknown the magnitude of the potential for pollutants to move through the ground, contaminating groundwater that serves as the area's water supply. Based on the extensive experience at Grant County copper mines with mine-impacted groundwater moving into the regional aquifer or offsite, the draft DP-1840 should require extensive evaluation of the geology underneath the mine to understand the potential for transport of mine effluent and to in turn develop appropriate permit conditions to protect groundwater.

- **Mandate that state water quality standards apply** – The draft permit assumes that the mine pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will likely combine with clean groundwater and extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

305A North Cooper St. Silver City, NM 88061
575.538.8078 • www.gilaresources.info • grip@gilaresources.info

- **Expand groundwater monitoring network at mine site** – We concur with NMED's requirement for two additional groundwater monitoring wells, but we believe this is still insufficient to reliably detect contamination discharged from the mine's waste rock piles and the tailings storage facility. As seen at the Tyrone mine, mine-impacted groundwater has moved across a fault line that was thought to be a barrier to groundwater movement. Contamination has also moved into the regional aquifer. Because the monitoring network is not dense enough, this contamination was able to move downgradient without being detected until much later. An effective monitoring network is critical to the capture system that will contain discharges from the Copper Flat mine site. GRIP believes that the monitoring network must be expanded to properly detect discharges from the mine site.

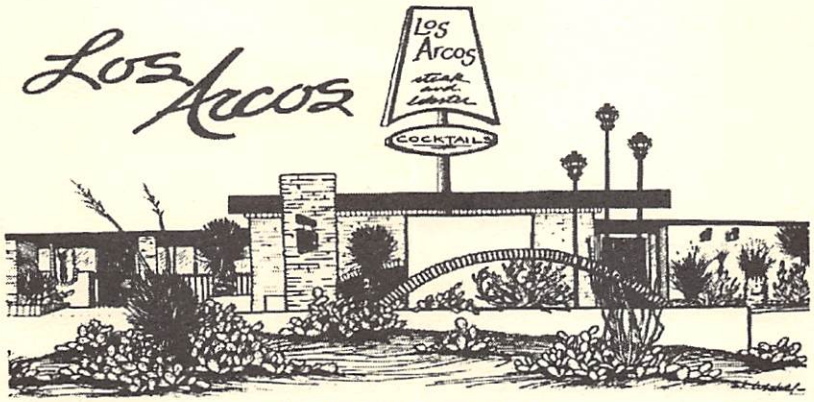
- **Ensure that streams important for wildlife and endangered species are protected** – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species. We are particularly concerned that stormwater management plans at the Copper Flat mine take into consideration climate change predictions of increased frequency of severe precipitation events. Best management practice recommends that design standards use a 200-year/24-hour storm event. More severe 500-year storm events have already occurred in the region. Permit conditions should reflect the reality on the ground.

- **Require adequate financial assurance to protect the state, taxpayers and local communities** – The proposed financial assurance in the draft permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the mine operator default. Cost estimates should be developed assuming monitoring and maintenance for at least 100 years, and sufficient financial assurance put in place to cover these costs.

Thank you for your consideration of our comments.

Sincerely,

Allyson Siwik
Executive Director



P. O. Box 786 • 1400 North Date St.
(505) 894-6200
Truth or Consequences, New Mexico 87901

9/27/2018

Felicia Orth,

My name is Robert Middleton. I was born here in Hot Springs (now Truth or Consequences), New Mexico. I own Los Arcos Steak and Lobster Restaurant in T or C. and have been in business here for over 48 years. I did not have a chance to speak at the NMCC Copper Flat Mine Groundwater Protection Discharge permit. Thanks for allowing me to submit a written statement.

I have strong feelings about the positive economic impact that it will have on our struggling community and have seen the positive economic impact personally here in Sierra County. I was in business at Los Arcos in the late 70's and early 80's while the Quintana Mine was in the construction and production phase. It was the only time in the last 48 years that I have seen a significant economic impact in my business and in our community. Our community was flourishing due to workers with good paying jobs and paychecks to spend here in our community. It would be wonderful to see that again and for our youth to have the opportunity of choice to remain in our community without leaving for employment elsewhere as we have seen for years.

Thank you for your consideration.

Sincerely,

Robert Middleton (owner)
Los Arcos Steak and Lobster

State of New Mexico

Shelly Trujillo
County Clerk
575-894-2840

Terri Copsin
County Treasurer
575-894-3524

Keith W. Whitney
County Assessor
575-894-2589

Tom Pestak
Probate Judge
575-894-2840

SIERRA COUNTY
NEW MEXICO

855 Van Patten Street
Truth or Consequences, New Mexico 87901

Bruce Swingle, County Manager
575-894-6215 voice 575-894-9548 fax

County of Sierra

Kenneth Lyon
Chair
575-894-6215

Frances Luna
Commission Vice-Chair
575-894-6215

Jim Paxon
Commissioner
575-894-6215

Glenn Hamilton
County Sheriff
575-894-9150

NM Environment Department
Copper Flat Mine Ground Water Discharge Permit Public Hearing
September 24-28, 2018

My name is Bruce Swingle, County Manager for Sierra County and I am speaking on behalf of the Sierra County Board of County Commissioners. The Sierra County Commission has and continues to support Copper Flat Mine. In determining whether to support the Mine, as a matter of public policy, County leadership relied on much data and information presented by many credentialed professionals. Professionals with extensive experience and expertise.

After assessing New Mexico Copper Corporation's (NMCC) business model and environmental safeguards, the county commission has approved two resolutions of support for the Mine. The City of Elephant Butte and Village of Williamsburg also approved resolutions of support. Suffice it to say, the vast majority of Sierra County residents support the Mine.

Today, NMCC gave an impressive presentation on Copper Flat Mine operations and mitigation plans to protect the environment and area resources.
Let us not forget, NMCC is trying to reopen a mine that has been operating on and off for generations, in an area where the mining of copper and other precious metals has been a part of this community since the 1880's. Mining, particularly at the Copper Flat Mine site is culturally and historically connected to Sierra County. Hillsboro was originally selected as Sierra County's, county seat, only because of mining and the mining population in the area.

Many misrepresentations are circulating about how the Mine will harm the Rio Grande Valley. These misrepresentations are intended to scare people and create hysteria against the Mine. The fact is NMCC is committed to responsible mining and implementing reasonable environmental protections to safeguard our community and state.

One of the misrepresentations is that due to a water contract, the Mine is required to hire only members of the Jicarilla Apache Nation. "Indian Preference" language is common boilerplate language in contracts with Native American entities. As a former County Manager in McKinley County, I entered in to a number of contracts with similar language. "Indian Preference" simply means that if you have two candidates with equal skills, experience and suitability, you hire the Native American. You hire the candidate that is best qualified and best suited for the job, which of course could be a Jicarilla Apache member.

Regardless of the contract with the Jicarilla's, the Mine will need to hire many skilled workers from outside the county. Sierra County does not have enough skilled workers in the mining industry to satisfy the Mine's needs. Growing our community's population is an intended benefit we welcome.

Another misrepresentation is that NMCC will bus employees to the Mine from various areas of the state. Thus, no or limited Sierra County residents will be employed. The truth of the matter, creating vanpools to transport workers to the job site is positive for all concerned. Transporting workers from T or C to the Mine decreases traffic and serves as a benefit to employees. The St. Cloud Mine and many other operations around the state use vanpools.

The final misrepresentation I will discuss is about mining camps. This misinformation claims that no Mine employees will live or shop in our community, and that Mine employees will be forced to live, work and shop on Mine property. NMCC is not creating mining camps in Sierra County; although, mining camps, research camps, oil and gas field camps, and the like, serve a purpose in extremely remote areas. Copper Flat Mine is not in an extremely remote area.

Sierra County and the State of New Mexico need Cooper Flat Mine. New Mexico and Sierra County rank at the bottom of most socioeconomic measures. Copper Flat Mine can single-handedly change the economic landscape in Sierra County and vastly improve New Mexico's economy, without compromising the environment.

Sierra County's "Per Capita Income" is a meager $20,495, while the National rate is over twice that of Sierra County at $58,030. Sierra County is truly one of the poorest counties, in one of the poorest states.

The county's "Median Household Income" is $29,679, substantially lower than New Mexico's rate of $46,748. The National "Median Household Income" rate is even higher at $59,039.

New Mexico has the 2nd worst "Poverty" rate in the United States at 20.4%. The National "Poverty" rate is 12.7%, while Sierra County's "Poverty" rate is over 22%. 22.1%

The "Mean Property Value" in Sierra County is $89,900, compared to New Mexico's at $167,500. Properties are not selling and there is virtually no new construction in Sierra County.

As of March 2018, Sierra County's "Unemployment" rate was 8.8%, compared to New Mexico's rate of 5.6%.

To compound the issue, Sierra County is losing its population. The county's population has declined about 19%, since 2000. Unfortunately, without the Mine and similar economic development projects that create jobs, the county's population will continue to decline.

Currently, our youth leave the community to seek meaningful employment, while our skilled workers work for far less than they can make in nearby communities. One cannot blame our youth and skilled workforce for leaving; they must work and receive reasonable wages.

From a public policy perspective, the only thing worse than the out migration of residents, is for

residents capable of working to stay in Sierra County. If they stay, they will remain unemployed or under-employed and survive on some form of government welfare or social assistance program.

Sierra County needs this Mine. Copper Flat Mine will provide a significant economic boost to Sierra County and New Mexico through job creation and tax revenues. The Mine will create approximately 1,300 direct, indirect and induced jobs. Copper Flat Mine is expected to create 275 direct jobs, making it the largest employer in the county. The estimated **taxes** paid over construction and life of the Mine is approximately $175 million.

Property taxes alone are projected to exceed 6.5 million dollars. In a county that only collects 8 million dollars a year in property taxes, the Mine's taxes will equate to improved services, better quality of life for our residents and provided much needed revenue to our schools.

The Mine will stimulate population growth, improve employment rates, increase earnings per capita, positively affect our housing market, improve the quality of life of area residents, and certainly affect other key-industries in the area, such as, construction, retail, arts, entertainment, recreation, health care, and tourism.

The entire state will benefit from Copper Flat Mine. As of February 2018, NMCC has spent 38.8 million dollars in New Mexico. Of that, $3.4 million in Sierra County, $12.6 million in Albuquerque and $22.8 million in other areas of the state.

With respect to the environment, we are all environmentalists. We all want to protect our natural resources; these resources sustain our way of life and our culture. However, if someone is against mining because of a belief that all mineral extraction is an assault on the environment, they will never support Copper Flat Mine or any other mine for that matter.

Reasonableness must prevail. Mining is accomplished all over the country without harming the environment. After hearing NMCC's presentation, reasonable people will agree that NMCC is implementing reasonable safeguards to protect the environment and our community.

This environmental debate reminds me of the **Dakota Pipeline protests** in 2016. Extremists, and I do not use the term "extremist" carelessly or irresponsibly... Extremists from around the country reacted to construction of an oil pipeline running from North Dakota to southern Illinois. In reality, it was a pipeline similar to the 2.4 million miles of energy-pipeline running across this country. This specific pipeline created no greater threat than any other pipeline to the environment, but these individuals, failed to reason and believed this particular pipeline would cause irreparable harm to the environment.

Folks, you are seeing an extreme element that will not reason or rationalize facts. They are against the Mine no matter what measures NMCC employs. They believe mining, in any fashion, will destroy the environment. They believe creating good paying jobs through mineral extraction is harmful to the environment. They fail to comprehend that preservation of the environment and the creation of jobs are not mutually exclusive.

After decades of regulations, state and federal oversight, and scientific and technological advancements, extremist refuse to acknowledge that a win win scenario can be achieved. Based on the plan articulated by NMCC today, the Sierra County Commission believes NMCC's Mine exceeds every reasonable standard.

The commission implores you to make a reasonable decision, make the right decision for Sierra County and the State of New Mexico, and approve Copper Flat Mine's Groundwater Protection Discharge Permit.

Thank you for giving Sierra County the time and opportunity to support Copper Flat Mine.

Total annual payroll, 2016 ($1,000)

QuickFacts
Sierra County, New Mexico

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

PEOPLE	
Population	
Population estimates, July 1, 2017, (V2017)	11,116
Population estimates base, April 1, 2010, (V2017)	11,994
Population, percent change - April 1, 2010 (estimates base) to July 1, 2017, (V2017)	-7.3%
Population, Census, April 1, 2010	11,988
Age and Sex	
Persons under 5 years, percent	▲ 4.9%
Persons under 18 years, percent	▲ 15.8%
Persons 65 years and over, percent	▲ 35.5%
Female persons, percent	▲ 49.7%
Race and Hispanic Origin	
White alone, percent (a)	▲ 92.3%
Black or African American alone, percent (a)	▲ 0.8%
American Indian and Alaska Native alone, percent (a)	▲ 3.0%
Asian alone, percent (a)	▲ 0.7%
Native Hawaiian and Other Pacific Islander alone, percent (a)	▲ 0.1%
Two or More Races, percent	▲ 3.1%
Hispanic or Latino, percent (b)	▲ 30.3%
White alone, not Hispanic or Latino, percent	▲ 65.1%
Population Characteristics	
Veterans, 2012-2016	1,837
Foreign born persons, percent, 2012-2016	4.0%
Housing	
Housing units, July 1, 2017, (V2017)	8,542
Owner-occupied housing unit rate, 2012-2016	72.6%
Median value of owner-occupied housing units, 2012-2016	$89,900
Median selected monthly owner costs -with a mortgage, 2012-2016	$838
Median selected monthly owner costs -without a mortgage, 2012-2016	$273
Median gross rent, 2012-2016	$582
Building permits, 2017	1
Families & Living Arrangements	
Households, 2012-2016	5,341
Persons per household, 2012-2016	2.10
Living in same house 1 year ago, percent of persons age 1 year+, 2012-2016	88.6%
Language other than English spoken at home, percent of persons age 5 years+, 2012-2016	19.5%
Education	
High school graduate or higher, percent of persons age 25 years+, 2012-2016	82.8%
Bachelor's degree or higher, percent of persons age 25 years+, 2012-2016	17.7%
Health	
With a disability, under age 65 years, percent, 2012-2016	14.9%
Persons without health insurance, under age 65 years, percent	▲ 10.3%
Economy	
In civilian labor force, total, percent of population age 16 years+, 2012-2016	44.7%
In civilian labor force, female, percent of population age 16 years+, 2012-2016	43.7%
Total accommodation and food services sales, 2012 ($1,000) (c)	15,787
Total health care and social assistance receipts/revenue, 2012 ($1,000) (c)	40,197
Total manufacturers shipments, 2012 ($1,000) (c)	D
Total merchant wholesaler sales, 2012 ($1,000) (c)	D

Total retail sales, 2012 ($1,000) (c)	102,090
Total retail sales per capita, 2012 (c)	$8,583
Transportation	
Mean travel time to work (minutes), workers age 16 years+, 2012-2016	16.1
Income & Poverty	
Median household income (in 2016 dollars), 2012-2016	$29,679
Per capita income in past 12 months (in 2016 dollars), 2012-2016	$20,495
Persons in poverty, percent	⚠ 27.0%

BUSINESSES

Businesses	
Total employer establishments, 2016	217
Total employment, 2016	2,411
Total annual payroll, 2016 ($1,000)	**64,049**
Total employment, percent change, 2015-2016	4.0%
Total nonemployer establishments, 2016	713
All firms, 2012	837
Men-owned firms, 2012	333
Women-owned firms, 2012	299
Minority-owned firms, 2012	209
Nonminority-owned firms, 2012	558
Veteran-owned firms, 2012	104
Nonveteran-owned firms, 2012	652

GEOGRAPHY

Geography	
Population per square mile, 2010	2.9
Land area in square miles, 2010	4,178.96
FIPS Code	35051

Value Notes

⚠ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to the left of e TABLE view to learn about sampling error.

The vintage year (e.g., V2017) refers to the final year of the series (2010 thru 2017). *Different vintage years of estimates are not comparable.*

Fact Notes

(a) Includes persons reporting only one race
(b) Hispanics may be of any race, so also are included in applicable race categories
(c) Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

Value Flags

D Suppressed to avoid disclosure of confidential information
F Fewer than 25 firms
FN Footnote on this item in place of data
NA Not available
S Suppressed; does not meet publication standards
X Not applicable
Z Value greater than zero but less than half unit of measure shown
- Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of distribution.

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

WAGES

Median Household Income

View Data | Save Image | Share/Embed | Add Data to Cart

$29,679

2016 VALUE
± $3,208

Households in Sierra County, NM have a median annual income of $29,679, which is less than the median annual income in the United States. Look at the chart to see how the median household income in Sierra County, NM compares to that in it's parent locations.

Dataset:
Source:

Google sierra county nm unemployment rate

All News Images Shopping Maps More Settings Tools

About 506,000 results (0.81 seconds)

Sierra County, New Mexico / Unemployment rate

8.8% (Mar 2018)

Explore more

Sources include: Bureau of Labor Statistics *Feedback*

Unemployment Rate in Sierra County, NM - FRED - Federal Reserve ...
https://fred.stlouisfed.org/series/NMSIER1URN?utm_source=series...
Aug 1, 2018 - Graph and download economic data from Jan 1990 to Jun 2018 about Sierra County, NM; NM; Prosperity Scorecard; unemployment; rate; and ...

Unemployment Rate in Sierra County, NM - FRED - Federal Reserve ...
https://fred.stlouisfed.org/series/LAUCN350510000000003A
Graph and download economic data from 1990 to 2017 about Sierra County, NM; NM; Prosperity Scorecard; unemployment; rate; and USA.

NM; Sierra County, NM; Rate; BLS; County - Economic Data Series ...
https://fred.stlouisfed.org/.../series?...bls%3Bcounty%3Bnm%3Brate%3Bsierra+county...
2 economic data series with tags: NM; Sierra County, NM; Rate; BLS; County. FRED: Download ... Unemployment Rate in Sierra County, NM. Percent, Not ...

Employment & Unemployment - Map: LA - Bureau of Labor Statistics
https://data.bls.gov/map/MapToolServlet?...unemployment...county...u
Map Title: Unemployment rates by county, not seasonally adjusted. Map Type: New Mexico county Map Month/Year: ... Sierra County, 9.1. Socorro County, 6.5.

[PDF] Population Ratio Estimates The Employment-to-Population Rat
https://www.dws.state.nm.us/.../The_Employment-to-Population_Ratio_Official_and_...
of county-level E/P ratios from the Census Bureau's American .... Exhibit 3: New Mexico and United States Share of Population Fully Utilized .... Sierra County.
You've visited this page 2 times. Last visit: 3/11/18

FRED | Unemployment Rate in Sierra County, NM | Quandl
https://www.quandl.com/.../NMSIER1URN-Unemployment-Rate-in-Sierra-County-N...
Quandl is a marketplace for financial, economic and alternative data delivered in modern formats for today's analysts, including Python, Excel, Matlab, R, and via ...

Sierra County NM Economy data business market research Dona Ana ...
www.towncharts.com › USA › New Mexico
Sierra County NM Economy data business market research with charts and graphs ... earnings, self employment, poverty, commuting Dona Ana County and Socorro County. ... Figure 16 shows Sierra County illustrates it has 4.5% unemployment rate which is the .... Figure 1: Sierra County, NM Median Earnings per Worker

U.S. Census Bureau QuickFacts: Sierra County, New Mexico
https://www.census.gov/quickfacts/table/BZA210214/35051

Sierra County, New Mexic

Sierra County is a county in the U.S. state of Ne census, the population was 11,988. Its county s Consequences. Wikipedia

Area: 4,236 mi²
Population: 11,282 (2015)
County seat: Truth or Consequences
Points of interest: Elephant Butte Lake State Pa
Rivers: Alamosa Creek, Taylor Creek, Rio Grand

Destinations


Gila National Forest


Truth or Conseque...


Cibola National Forest

People also search for


New Mexico


Grant County, New Mexi...

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Enter a state, county, city, town, or zip code:

e.g., Atlanta, GA

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Population
Age
Business and Industry
Education
Governments
Housing
Income
Origins and Language
Poverty
Race and Hispanic Origin
Veterans
Show All

Sierra County, New Mexico

Population

Bookmark/Save Print

2017 Population Estimate (as of July 1, 2017)

11,116 Source: **2017 Population Estimates (/bkmk/table/1.0/en/PEP/2017/PEPANNRES/0500000US35051)**

Popular tables for this geography:

2010 Census

General Population and Housing Characteristics (Population, Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/DEC/10_DP/DPDP1/0500000US35051)
Race and Hispanic or Latino Origin (/bkmk/table/1.0/en/DEC/10_SF1/QTP3/0500000US35051)
Hispanic or Latino by Type (Mexican, Puerto Rican, ...) (/bkmk/table/1.0/en/DEC/10_SF1/QTP10/0500000US35051)
Households and Families (Relationships, Children, Household Size, ...) (/bkmk/table/1.0/en/DEC/10_SF1/QTP11/0500000US35051)
Compare Cities and Towns for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/10_SF1/GCTPH1.CY10/0500000US35051)
Compare Census Tracts for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/10_SF1/GCTPH1.CY07/0500000US35051)

2016 American Community Survey

Demographic and Housing Estimates (Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/ACS/16_5YR/DP05/0500000US35051)

2017 Population Estimates Program

Annual Population Estimates (/bkmk/table/1.0/en/PEP/2017/PEPANNRES/0500000US35051)

Census 2000

General Demographic Characteristics (Population, Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/DEC/00_SF1/DP1/0500000US35051)
Compare Cities and Towns for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/00_SF1/GCTPH1.CY10/0500000US35051)

Want more? Need help? Use Guided Search or visit Census.gov's Quick Facts (//www.census.gov/quickfacts/).

18769

Reopening the Copper Flat mine is a terrible idea on several counts.

I spoke with Brad Reid at the water quality bureau in Albuquerque, who told me that this mine will require a water tailing storage facility encompassing several hundred acres. It will be an open air, plastic lined pit of several hundred acres! Any runoff will flow down the face of a dam into some sort of collection pond. I don't know the size of that. What kind of vapors will that give off? Toxic elements that will drift into the air around the neighbors in the area? The absolute destruction of several hundred acres of beautiful land and wildlife habitat should be enough to block this project, but to dump noxious tailings into such a huge, plastic lined pit, endangers the ground water, a much more precious resource than the copper they hope to extract. If the water tailing storage pit develops a leak, how could it possibly be repaired or even detected before ground water contamination occurs?

I hear there is a very loud smashing and grinding involved in processing the ore on site. Besides the noise, there is an airborne dust created, which, I imagine, is not pleasant to breathe, either.

So, besides the air pollution, water pollution, and

noise pollution, this project plans to operate right next door to the Ladder Ranch, a well known environmental preservation project which, as of Friday the 21st, had a total of 191 visitors this year, with a full schedule of tours for October. The mine is the exact opposite of this immediate neighbor's business, and is absolutely the most ruinous of neighborhood projects imaginable.

The couple hundred local folks proposed to be employed by the mine does not compete with the money that hundreds of tourists a year consistently spend on local hotels and restaurants so they can observe and appreciate the amazing and beautiful natural landscape and wildlife that New Mexico is known for, and that our children will inherit for generations to come.

The short term thinking of the bottom line of this mine will dry up our local wells with an outrageous number of gallons of water usage. Where will we be then?

Ecotourism will endure forever if we protect this sustainable industry.

Thank you

RHONDA BRITTAN

TRUTH or CONSEQUENCES, NM

the

NEW MEXICO BUSINESS COALITION

Comments for Copper Flat Mine NMED Groundwater Discharge Permit Hearing

My name is Ray Irwin. I am a registered professional geologist currently serving as Exploration Manager for Stella Natural Resources, and I'm here today on behalf of the New Mexico Business Coalition.

As you may or may not be aware, the New Mexico Business Coalition is a grass-roots, statewide, pro-business association. We support job creation and reasonable regulation, which includes granting of the necessary discharge permit for the Copper Flat Mine.

As V.P. of Exploration for THEMAC Resources from January 2012 to December 2013, I planned and supervised all geology related activities at the Copper Flat mine site. As a result, I have specific knowledge and a deep understanding of the project's geology and potential environmental impacts due to planned mining. During and since my time working on the project, THEMAC Resources has expended a very significant amount of time and money to develop a mine plan that will safely exploit the copper deposit at Copper Flat in an environmentally sound manner that complies with all State and Federal regulations, and minimizes long term environmental impact.

You will probably be hearing opposition to this mine that is largely, if not completely emotionally based. My comments will stick to what I know to be a fact. The Copper Flat Mine is going to be a closed-loop facility, which not only minimizes water consumption but also prevents water from leaving the premises except via evaporation. Additionally. a lined tailings storage facility equipped with an impermeable synthetic pond liner will be constructed to prevent water used in the milling process from seeping into ground water while simultaneously the mill tailings are secured by an engineered structure to prevent discharge into nearby drainages.

Since the planned operations of the Copper Flat Mine will be a zero-discharge facility, it will not require a National Pollutant Discharge Elimination System permit from the EPA, which governs surface water discharges. Likewise, under current mine plans and designs, Copper Flat will not need a 404 permit from the U.S. Army Corps of Engineers.

With these plans in place and federal agencies satisfied, NMBC is confident that a Groundwater Discharge Permit approved by the New Mexico Environmental Department would be a prudent step in moving the development of the Copper Flat Mine forward.

From an economic perspective and during the 18 to 24-month construction period, the Copper Flat Mine will generate approximately 1,150 direct, indirect, and induced jobs in the region and the State.

Once in operation, the Copper Flat Mine will generate approximately 275 to 300 long-term, high paying jobs at the Sierra County location; and similar to the construction phase, many more indirect project related service and support jobs in the region and State.

The estimated annual mine payroll is approximately $16 million before payroll taxes and benefits. These anticipated new high paying jobs with good benefits is exactly what Sierra County and New Mexico needs.

The NMBC and I, therefore, ask that your decision on this important issue not be swayed by negative misinformation and encourage you to approve the Groundwater Discharge Permit.

Thank you

NEW MEXICO MINING ASSOCIATION
COMMENTS--PUBLIC HEARING ON PROPOSED DISCHARGE PERMIT DP-1840
FOR NEW MEXICO COPPER COMPANY, COPPER FLAT PROJECT
SEPTEMBER 25, 2018

My name is Michael Bowen and I am the Executive Director of the New Mexico Mining Association ("Association"), whose address is 1470 St. Francis Drive, Santa Fe, New Mexico 87505. The New Mexico Mining Association currently has 18 operator members who explore, mine, produce and refine sand and gravel and other aggregates, coal, copper, humate, industrial minerals, molybdenum, potash, precious metals and uranium in New Mexico. In addition, the Association has over 70 associate members who provide consulting, construction, engineering, drilling, laboratory, legal, reclamation, and other services, and equipment, fuel, power, chemicals and other supplies to the New Mexico mining industry. The Association serves as a spokesman for the industry and is active in representing its members and keeping them informed concerning legislation and regulatory developments. It also serves its members on a wide variety of subjects such as taxation, environmental quality, public lands, health and safety, and education primarily through the expertise of its members and member companies.

According to the latest Annual Report published by the Energy, Minerals and Natural Resources Department, in 2016 the mining industry in New Mexico

reported production values of more than $1.7 billion. New Mexico ranks first in the U.S. in potash production, second in copper production, and 11th in coal production. New Mexico was once a leader in the production of uranium and still has large uranium resources that may be mined in the future, market conditions permitting.

Total direct and contract employment by the mining industry in 2016 was just under 5000, with total payrolls over $330 million. Mining jobs are typically some of the highest paying and sought-after jobs, particularly in rural areas. Mining creates many additional jobs in the community, as illustrated by the goods and services provided by our associate members, and other local goods and services provided to our mine employees. Since most mining operations are located in rural areas, these jobs are critical to the local economies where the mines operate.

Minerals are vital to everyday life. All of our electrical energy is supported by mineral production, including electric power generated from coal, uranium and oil and gas, as well as renewable power generation that requires steel and copper and other metals for wind towers and motors; steel, copper, silver and other metals for photovoltaic cells and solar installations; and copper, steel and other metals for transmission lines. Potash and other fertilizers are essential to produce our food, and our roads and buildings for homes and businesses cannot be constructed

without aggregates. If these essential minerals are not being produced in New Mexico, they must be produced somewhere else. New Mexico might as well enjoy the economic benefits of mineral production as well as the everyday benefits that consume minerals. As the Legislature said in the Mining Act, the exploration, mining and extraction of minerals is vital to the welfare of New Mexico.

I believe this is the first public hearing held on a proposed discharge permit under the Copper Rule. The Copper Rule was adopted by the Water Quality Control Commission in December 2013 pursuant to the New Mexico Water Quality Act. Since then, the Copper Rule has been scrutinized and upheld on appeals to the New Mexico Court of Appeals and the Supreme Court, in each case by unanimous decision. The Copper Rule implements legislation passed in 2009, so the Copper Rule has been backed by all three branches of New Mexico's government. The Copper Rule specifies detailed requirements for the design, construction, operation, monitoring and closure of copper mines to protect ground water quality. These requirements are based upon experienced gained under discharge permits issued over nearly 40 years.

I am impressed by New Mexico Copper Company's plans for the Copper Flat project. New Mexico Copper has worked tirelessly to satisfy the requirements of multiple federal and state agencies, including BLM, the U.S. Fish and Wildlife Service, the Environment Department, and the Mining and Minerals Division.

While this hearing is limited to consideration of the requirements for a ground water discharge permit, the mine plans reflect the need to comply with a myriad of environmental protection laws. These plans have taken years to come to fruition at a tremendous cost, representing New Mexico Copper's investment in the development of New Mexico's mineral resources. I am happy to see that the Environment Department has issued a draft permit based upon the Department staff's conclusion that New Mexico Copper's mine plans appear to meet or exceed all of the requirements of the Copper Rule and the Commission's regulations. With the permit conditions proposed by the Department, the Copper Flat project will be operated in a manner that protects ground water quality.

As I previously discussed, development of New Mexico's mineral resources provides many local and statewide economic benefits and employs many local residents. Issuance of a discharge permit for the project will be a great step forward to realizing the important benefits this project will provide in terms of employment, revenue for local and New Mexico businesses, and substantial contributions to state and local tax revenues to support our schools, roads, and other government services.

Many years have been spent and countless dollars spent for experienced engineers, scientists, and other experts to develop the plans for the Copper Flat project. These plans must comply with the myriad of federal and state laws and

regulations imposed on mining projects to ensure protection of public health and safety and the environment. Nevertheless, project opponents seek to distract from all of these protections by creating imagined scenarios intended to scare the public and exaggerate the risks. Many of these perceived risks have nothing to do with the Copper Rule, ground water protection, and the matters at issue in this hearing. I urge the Hearing Officer and the Department to focus on the requirements set out by the Water Quality Control Commission. Other matters, such as dam safety requirements and water supply issues should be left to consideration by the agencies assigned by the Legislature to consider those issues.

Approving DP-1840 will be good for the state and local communities, and will send the right message to mining companies that are willing to invest significant resources in promising projects such as the Copper Flat Mine. For these reasons, on behalf of the New Mexico Mining Association, I urge you to approve Discharge Permit DP-1840 after considering all relevant testimony and comment.

Public hearing comments on Copper Flats Mine

September 24, 2018

Good morning. I am Dr. Kathleen Blair. I am a resident of Hillsboro and have owned property there for 10 years. My Pd.D. is in Zoology with a specialization in Ecology, particularly the impacts of natural and human caused changes in natural processes to ecosystems. I have taught a wide variety of university courses as an assistant professor in ecology, environmental biology, botany, and wildlife biology and management at Central Missouri State and West Texas A&M universities and as adjunct at Texas A&M. For the last 20 years I have been the ecologist for the U.S. Fish and Wildlife Service at the Bill Williams River NWR which is located downstream of the Bagdad Copper Mine. Consequently, I have professional expertise as well as a personal interest in the results of this discharge permit hearing for the Copper Flat Mine.

Copper and other minerals it is found in association with as well as many by-products of processing, have been found highly toxic in multiple studies. As a result, I have 4 major concerns I do not believe have been adequately addressed relative to this discharge permit:

A) Federally protected migratory waterfowl and New Mexico wildlife species of concern will be attracted to this extremely large, increasingly toxically contaminated water of the settling/evaporation ponds and pit lake as they have been to many similar features in mines in Arizona and throughout the desert west. This has resulted in major deaths of wildlife and high costs in fines and remediation for the mines. I see no provision for preventing this from occurring.

B) Due to the toxicity of copper, as well as ancillary contaminants, any discharge from the catchment basin into surface or groundwater regardless if accidental human error or a natural event in excess of your current parameter estimates could be severely damaging for people, wildlife, and plants in the watershed downstream of the mine. Such impacts would include the rural residents of Animas and Percha watershed, the town of Caballo, Caballo Reservoir, Percha Dam State Park and potentially into the lower Rio Grande mainstem. This would likely last for decades, or perhaps in perpetuity, as it has elsewhere. Naturally occurring contaminants released or exposed by mining activities and not considered in these documents may well prove to be the most damaging of all even as mercury from the Bagdad has contaminated Alamo Lake, one of the top bass fishing lakes in Arizona, until the fish are frequently found to exceed human safe consumption levels. Effects on other wildlife has not been as well tracked.

C) Copper is necessary in small quantities for healthy plant development but can be highly toxic in higher concentrations especially in water as noted by recent concerns for copper as well as lead in public water supplies. It is the primary algaecide, fungicide, and herbicide for aquatic application. Wind driven dust from the massive tailing piles and the dry sediments from the evaporation ponds carrying copper, as well as other companion contaminants, may easily affect the people, wildlife, and plants downwind. Once rain carries the contaminated dust to the ground it enters the soil where plants and critical mycorrhizal fungi can uptake it and be damaged and killed. Without those soil fungi communities restoration will not have good success. It not an accident that the land and hillsides around such towns as Globe, Bisbee, Santa Clara, and Bagdad look like they have been sterilized. They have been. And ask Ottawa county

Oklahoma about making the deadly mistake of using mine tailings on roads and infrastructure projects.

D) Climate change has not been adequately addressed in my opinion.
   1) Projections of increasing temperatures in New Mexico for the foreseeable future will result in higher evaporation rates than projected. This will increase the contamination concentration in the settling basins and pit lake especially when combined with the recycle/reuse process. Higher evaporation rates will also speed the exposure of toxic sediments as dust which becomes airborne for distribution downwind to contaminate air quality in the air and the watershed after rain.
   2) Flash flood potential will be increasing over the time this mine is projected to function. Although overall the weather pattern is reliably projected to increase drought overall, rain events resulting in increased severity of flash flooding is projected to increase and has begun to be documented in many locations in the western US. This will be further fueled by increasing forest fire frequency and severity altering the watersheds to further increase flooding. Such ecosystem processes require many decades to regain the ability to temper heavy rain fall. Hurricanes in the Gulf of Mexico are projected to increase in intensity and some of those impact New Mexico such as the massive flooding from Hurricane Dolly in Ruidoso 2008 proved as well as hurricanes crossing Mexico from the Pacific bringing high rainfall. Should any feature holding or directing contaminated water including the permanently and increasingly contaminated pit lake be overtopped, eroded, or fail at any time during or after mining activities, the downstream flow of heavily contaminated and sediment would damage property and water resources potentially as far are Caballo Reservoir and the lower Rio Grande, perhaps permanently. There are certainly many, many examples of both mine retention ponds being over topped, failing due to flooding, and accidental release due to human error. I see no provision for an emergency retaining structures to protect the downstream watershed from any of these events during the life of the tailings storage ponds until it is fully reclaimed or afterwards should closure sealing fail, or for the pit lake at all. The pit lake will be a permanent pollution machine.
   3) Species and genetics of plant community chosen for restoration. Has anyone done a botanically valid flora of the area to enhance success? Worked with universities? New Mexico Plant Material lab? In light of climate changing the vegetation?

Kathleen Blair, Ph.D.

PO Box 494, Hillsboro, NM 88042

575-895-5159

In the matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

First I would like to read part of New Mexico's Constitution that I feel is important to granting this discharge permit.

Article 22, Section 21 of the Constitution of the State of New Mexico says, **"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."**

I would ask if leaving 700 vertical feet of steep pitwalls after mining 'protects' the state's beauty or health. This seems to benefit TheMac and NOT the people.

Second, I am confused about letting this Discharge Permit go through at this time as the Australian company that owns the mine has not yet secured enough water to allow it to function more than 1 1/2 or 2 months of a year. If they cannot secure more, that means their 11 years of working time would extend way into the future. My concern is, trying to learn from the history of like mining, would they even be in business so many years down the road. I would ask that this Discharge Permit not even be considered until the mine has secured enough water to function.

Third, I am told the Reclamation Bond of 54 million dollars the mine suggests has not been legally set and I again ask that the Discharge Permit not be considered until a Reclamation Bond is in place.

I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

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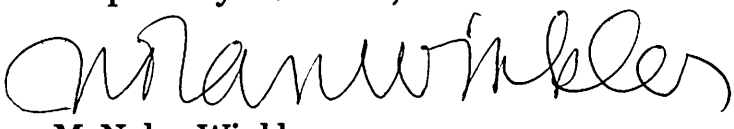
I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,



M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

Hello. My name is Dan Lorimier and I'm a 40 year resident of Sierra County where I live rurally. I have installed and maintain a private water well to supply my home and property.

Thanks to the Department for holding this public comment session and thanks to the Hearing Officer for formalizing it.

I was involved in the development of the 'Dairy Rule' stipulated agreement with this agency and the NM dairy industry in 2013-14 and 15. From that work, I developed a sense of the importance of synthetic liners with leak detection and recovery. I also became familiar with the problems associated with monitor wells and their after-the-fact pollution detection nature.

I oppose this Groundwater Discharge Permit as drafted and here is one reason: Originally, NMCC planned a double liner system with leak recovery between the two synthetic liners. So, they would have installed a gravel bed, a bottom plastic liner, an under-drain leak collection system plus leak detection sensors, a top plastic liner and then the tailings. The current plan, which is allowed by our new copper rule, calls only for a bed of gravel to hold a single synthetic liner and the tailings. It would also have a very mysterious component - an 'under-drain' collection system installed above the liner. The Department should ask how the planned system could capture and recycle leaks *above* the synthetic liner when its purpose is to recapture leaks between two synthetic liners.

What this plan calls for is actually an 'above-drain' water capture system that pumps water that's inside the tailings pond, to be used for production purposes. Nothing is there to prevent pollution that has made its way past or through the liner from entering the vadose zone and then the groundwater. Rather than prevent groundwater contamination, this plan proposes to install monitor wells. And, if pollution is detected, the company would install 'interceptor wells' to pump up and treat the polluted water. Is their financial assurance sufficient to cover these formidable potential expenses?

With wide agreement that the unlined tailings pond used in the past is currently causing groundwater pollution, shouldn't the Department require this Company to install 'interceptor wells' to treat the existing contamination at the outset of their production phase in addition to their planned monitor wells? Shouldn't this Company install these wells in anticipation of groundwater pollution from their single lined 'dumb' tailings pond that has no leak detection or under-lagoon pollution recycling capacity?

Again, I oppose this plan and this draft permit as written. The department might still fold together their mission to protect and improve our New Mexican groundwater quality while regulating a New Mexican industry as sanctified and ultra-legal as copper mining.

Thanks.

My name is Veronique De Jaegher. I live locally in Kingston. I am opposed to the granting of the Discharge Permit (Docket No. 8WB-18-06(P)) for many reasons...

I am concerned about the interceptor system around the dam of the tailings pond, a ring of wells that pumps groundwater back into the pond if contamination is detected in the monitoring wells.

Are there enough monitoring wells to detect all the contamination?

If the water if flowing fast, can't a stream of pollution go between the monitoring wells undetected at the wells?

The same questions can be asked about the interceptor wells.

How do they know if all the contamination will be captured.

How close do they have to be to each other?

How deep do the wells have to be?

Have they tested or even designed the system? If not, who will design and build the system if NMCC is gone, i.e., during reclamation.

Does the money NMCC leave with the state for reclamation include funds for an interceptor system that might be needed if after closure the monitoring detects contamination?

NMCC SAYS IT WILL CREATE 270 JOBS OVER 11 YEARS...I know that this issue is not germane to the granting of the Discharge Permit, but the issue is repeatedly brought up by the mine's supporters,

- First, in the contract that binds NMCC with the Jicarilla Apaches it is specifically stated that "NMCC will give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities" So those jobs won't be local employment...

SEE ARTICLE 21

POLICY STATEMENT ON INDIAN PREFERENCE

21.0 As an employer, the Nation seeks to employ individuals who possess the skills, abilities, and background to meet the employment needs of the tribe. As a sovereign Indian tribe and a unique cultural group, the Nation promotes preference for qualified Indian individuals in employment. Accordingly, the Nation has established Title 23 in the Jicarilla Apache Nation Code for hiring employees to provide services that meet the needs of the Nation's people. NM Copper hereby supports and endorses the policy of the Nation and shall reasonably consult with the Nation to give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities. It is the intent of NM Copper to build a core group of skilled labor candidates through job placement and training assistance to eligible enrolled members of the Nation....

- Second, that employment would be temporary because of the "stop and go" mining due to fluctuation of copper price and not enough water.

What happens to all those jobs when the mine temporarily closes??

Thank you for your attention.

Véronique De Jaegher
HC 69 Box 101
Hillsboro, NM 88042

Good evening, I am Nichole Trushell of Kingston. I am a biologist and have lived in the southwest all of my life.

As a resident of Kingston, why I am concerned -- this project is not located in my *backyard.* I care because if the **Discharge Permit** is granted, wheels will be in motion for stunning quantities of un-reclaimable water to be used, for toxic chemicals to be released from the soils, and for life-supporting waterways to be threatened. Groundwater would likely be impacted, as would Animas Creek, a unique ribbon of LIFE running through our dry landscape. The lives and farms of local people, many of whom have lived in along the Animas for decades, could be irreparably damaged. And, of course, the Animas flows into the Rio Grande.

Deciding in favor of this permit is wrong, key reasons for me:

1. The toxicity of the massive amount of waste material and its permanence. Serious questions: How can long term management of the liner be assured? Who truly understands the effects of the underlying geology? Who will monitor this area and the potential for devastating contamination for generations to come? Who monitors it now? Where are those reports? Who will respond when system failures occur? Who will pay for long term care?

2. The monumental use and toxification of precious water. The amounts of water proposed for operational needs are preposterous in a dry environment. I noted that a figure of 2.3 BILLION gallons of water was requested by NMCC for yearly operations. Unlike municipal water, this water will never directly recharge our groundwater – it cannot. Let's quickly calculate: If an average personal water use is say 125 gallons of water a day, this amount of water alone would supply a city of 50,000 people for a year!

3. The economic benefit is very short term and questionable at best. And a FOREIGN company is the greatest beneficiary, not New Mexicans.

In closing:
Allowing this project is a decision with effects long into the future – negative effects. If any of you have precious family, or care about water, you must not grant this permit. This excessive waste and toxic legacy will be yours. The TRUE COST to our water and to our environment is too great. <u>NO PERMIT.</u>

Thank you.

Nichole Trushell M.S.
123 Kingston North Street
Hillsboro, NM 88042

Docket No. 8WB-18-06(P)
Comments on the Draft Discharge Permit
1840 for the Copper Flat Mine before
the Secretary of the Environment.

I am opposed to the granting of this discharge permit as it has been proposed. It is the duty of the Environmental Department to protect the health and safety of the people and the environment from the contamination by toxic materials in the ground water. Because there is current contamination that has been known for 35 years, greater precautions should be taked. The 600 acre, 200ft deep Tailing Storage Facility is inadequately protected and monitored as planned. The proposed underdrain system does not satisfy the Copper Rule which specifies a tailing seepage collection system. [NMAC 20.6.7.22A(4)(d)(v) because it is above the liner and does not catch contaminants going past the liner and into the ground water. To do that NMCC should be required to construct an Interceptor System to function from the beginning of operation with verification that NMCC owns

enough water rights to operate a sufficient system.

Contaminants from this mine threaten both the Percha and Animas watersheds which drain directly into Caballo Lake and the Rio Grand River. It is your duty to protect the lives and livelihoods of those citizens who depend on the quality of these waters.

Finally, no permit should be granted until an adequate surety bond is negotiated and secured. This site has had many owners who have departed under bankruptcy. All promises of reclamation at the end of operations merely that, promises without an adequate surety bond in place.

William Lindeman
HC 69 Box 101
Hillsboro, NM 88042

September 17, 2018

My name is Steve Morgan. I am a Landscape Architect and I live in Kingston, NM.
I perform Living History performances as Aldo Leopold, considered by many as the most important conservationist of the 20th century because his ideas are so relevant to the environmental issues of our time. He is also referred to as the Father of the National Wilderness System, wrote the first book on Wildlife Management, established the science of ecological restoration and authored "The Sand County Almanac" in 1949, which stills inspires many to see the natural world as a community to which we belong.

I speak his words here:
We must quit this thinking about decent land use as solely an economic problem. Instead we should look at each problem in terms of what is ethically and aesthetically right, as well as economically expedient. For a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community.
It is wrong when it tends otherwise.

I strongly believe that if Aldo was aware of this current issue, he would say these words and also remind those involved that the total cost of this kind of economic destruction is never fully calculated. The amount of New Mexico water involved and the possibility of catastrophic flooding and the resulting environmental and economic destruction downstream should heavily outweigh the economic benefit to a foreign company.

I am opposed to granting the DISCHARGE PERMIT for the New Mexico Copper Company.

Thank you for accepting and considering my concerns and thoughts.
Sincerely,

Steve Morgan
Landscape Architect and Aldo Leopold Living History Performer
123 Kingston North St.
Hillsboro, NM 88042
(928) 830-9972

ADD: ETHICAL BEHAVIOR IS DOING THE RIGHT THING WHEN NO ONE ELSE IS WATCHING EVEN WHEN DOING THE WRONG THING IS LEGAL

I live on Animas Creek, and I encourage all of the hearing officers to take a drive up Animas Canyon to check out the magnificient Sycanmore trees - they are 350 to 450 years old - and see what is at stake here. This is not small potatoes -these are the redwoods of the southwest. If you make a decision - any decision- without seeing with your own eyes this incredible perennial riparian creek in New Mexico, then you are derelict in your duty to the people of New Mexico, and to seven generations that follow.

The pitlake and tailings pond that are at issue here are ten to fifteen miles upcreek from my home. The water production wells are even closer. We don't need an expert hydrologist to tell us that water flows downhill. I am assuming groundwater also flows in a similar manner. The last operator of this mine left in 1982. They left behind a tailings pond without a liner which as been leaking contamination into the groundwater for 35 years. Perhaps we have the cart before the horse here ... but I would think that an environment department of the State of New Mexico should perhaps be concerned that there is presently contamination leaking into the groundwater from the existing tailings pond before considering another permit by the same mine to do the same thing all over again!

And what about monitoring wells to monitor the plume of contamination that has already been contaminating the groundwater for 35 years? By NMED's own regulations, there should be interceptor wells in place to pump the contaminated groundwater back into the tailings pond. In order to do this, there would have to be sufficient water available in the interceptor wells, along with the water rights necessary to pump this water. There are no interceptor wells at present. This mine has had nine owners in forty years, and has only been in operation a total of three months in forty years. DUuing these forty years, numerous letters of violation have been sent by the NMED, none of which have been responded to. There has been no bond set to insure that reclamation is adequate. As a private property owner, who will I seek redress from if the groundwater becomes polluted ... do you think I will be able to find anyone to answer the phone? This is all just one big scam - a water grab, if you ask me. The promise of jobs and money flowing into Sierra County is minimal compared to the impact on not just Sierra County, but potentially the whole lower Rio Grande valley. Far more money is generated in the State of New Mexico from tourism than from mining - let's change our priorities. Our Land is more valuable than your money.

Catherine Berger
425 Animas Creek Road
Caballo NM 87931

I am against the Mine. The mine has hired experts to say "don't worry no tailings & ō pollution can escape ~~by~~ this man-made construction & remediation." The Cu Code = NM's Rs to protect us. The Mine is in compliance with this. The NM department for ^ environment thinks that the Cu Code which makes ^ Mine pay for remediation & monitoring for (25) years after the Mine closes should be responsible for 100 years. The multi millenias of mine operation. Our INDUSTRY has AU ^ happy. Our impoverished citizen w/ jobs 4 (15) yrs of mine operation. Ag Mo & Cu

This Mine will operate for maybe 15 years making MASSIVE ~~huge~~ pile of pollution. ~~Protect~~ Maybe ^ Mine will pay for 100 years of monitoring & maintenance. This pollution will ō go away. This = a superfund that hopefully will b contained. This site won't be cleaned up but the pollution will be covered up. That = considered good enough.

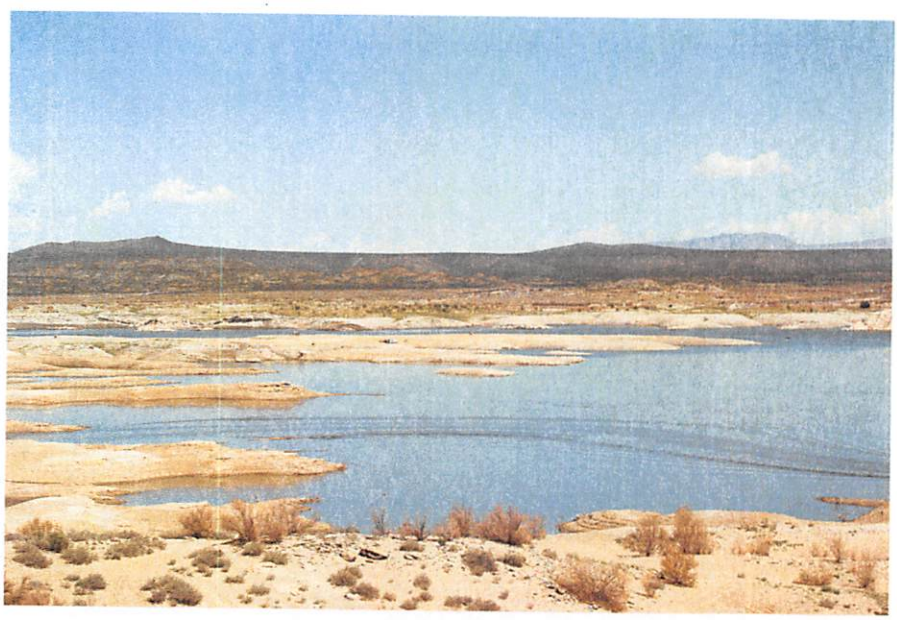
Imagine the year 4018 — if all went well for ^ last (2) millenia is intact. What do we know that was built 2000 years ago that is still functioning as designed? Unfortunately ^ covered up pollution is probably now uncovered & the pollution = ruining our O_2, Θ, & H_2O shed

Martin Mijal 503-288-3770

ENVIRONMENT 11 hours ago

As warming strains NM's water supplies, 'status quo' no longer works

By **Laura Paskus**



Laura Paskus

Elephant Butte Reservoir on Sept. 10, 2018, at 3.7 percent capacity. It has since dropped down to 3.0 percent capacity, or less than 60,000 acre feet of water

On the downstream side of Elephant Butte Dam, U.S. Bureau of Reclamation employees navigate a stairwell above the Rio Grande, passing scat from the ring-tailed cats that like to hang out here, and enter through a door into the 300-foot tall concrete dam.

Built in the early twentieth century, Elephant Butte Dam holds back water stored for farmers in southern New Mexico, the state of Texas and Mexico. At full capacity, the reservoir is about 40 miles long and can retain more than 2,000,000 acre feet of water.

Jesse Higgins, an electrician who manages the powerplant at the dam, goes first and flips on the lights, which flicker and fire up after a few minutes. Labyrinthine tunnels burrow throughout, and water drains along the sides of the narrow, elevated path. Inside, it's easy to imagine what the world was like in 1916, when the dam was completed. The Civil War had been over for half a century—nearly comparable to the time between the Vietnam War and now—and the Mexican Revolution was ongoing. Since 1916, there have been world wars and shifting alliances, medical and technological breakthroughs. Humans have visited the moon and landed a rover on Mars. Our understanding of the Earth and humanity's impacts upon it have changed, as well.

But during that time, comparatively little has changed when it comes to how water is managed in New Mexico. The Rio Grande Compact, which divides water among Colorado, New Mexico and Texas was signed in 1938. And New Mexico's water laws today are still based on codes that the territorial legislature passed in 1907.

This story is the second in a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters.

But as the climate changes and warmer temperatures affect the state's rivers, reservoirs and aquifers, the same tactics and strategies that may have helped New Mexicans weather dry times over the past century won't keep working. And perhaps no place in the state offers such a stark reminder of that fact than the reservoir behind this dam. After a dry winter and hardly any snowmelt this spring, Elephant Butte Reservoir is at three percent capacity, storing 58,906 acre feet of water as of September 24 (https://waterdatafortexas.org/reservoirs/individual/elephant-butte).

"Historically, people tend to listen to what they want to hear, rather than what they need to hear: What they need to hear is that our laws do not reflect hydrology and our hydrology is changing for the worse, and if we do not manage it, it will manage itself," says Phil King, an expert on hydrology and the relationship between surface and ground water in southern New Mexico. "I would much rather correct the system ourselves through management than let nature do it's cold, hard reality fix," adds King, a professor of civil engineering at New Mexico State University and a consultant to the Elephant Butte Irrigation District, or EBID.

Stopping the 'death spiral'

EBID serves about 8,000 farmers in the Rincon and Mesilla valleys in southern New Mexico, from Arrey to the border town of Santa Teresa. If you've eaten chile from Hatch or pecans from Mesilla, fed alfalfa to your horses or poured milk from a New Mexico dairy into your coffee, you've consumed water that EBID's farmers divert from the Rio Grande and Elephant Butte or pump from the aquifer.

For roughly a century, EBID farmers have supplemented irrigation water with groundwater. Without it, they would not have survived the drought of the 1950s. But they pumped during the wet years, too, including throughout the 1980s and '90s. Then, beginning around 2003, about four years into the Southwest's current drought period, pumping ramped up even more.

That's a problem, especially in the Rio Grande Valley, where river water recharges the groundwater, and pumping water from the aquifer makes it even thirstier for river water.

With both the surface water and the groundwater strained, the system suffers a double-whammy, King says. That causes a positive feedback or what King calls a "death spiral."

Even though scientists, engineers, hydrologists and farmers know the two are intertwined within the same system, in New Mexico, groundwater and surface water are managed separately. King calls that "hydrological folly."

"We've got some major rethinking to do with New Mexico water law: Status quo is not an option," he says. "I think what people need to understand is we are facing conditions that mankind has not faced here before."

And the only way to reverse that death spiral is to use less water.

Laura Paskus

Chile fields in southern New Mexico

One way to do that, King says, is to formalize a fallowing system that allows cities, factories and businesses—in Las Cruces or in burgeoning border cities like Santa Teresa—to pump groundwater if they pay southern farmers with surface water rights to fallow their fields. Another way is for farmers to reduce their irrigated acreage and grow higher-value crops.

It's clear that any real solutions to cut water use must focus on agriculture. That's because farms use 75 percent of the water in the Rio Grande Basin. Cities can implement conservation measures, and people can reduce their household water use, King says, but the overall savings are minimal. Even finding "new" sources of water to add to the system—like capturing stormwater runoff or desalinating brackish water—will only add only tens of thousands of acre feet, King says. That doesn't come close to making up for the amount of water drought and climate change deplete from the system.

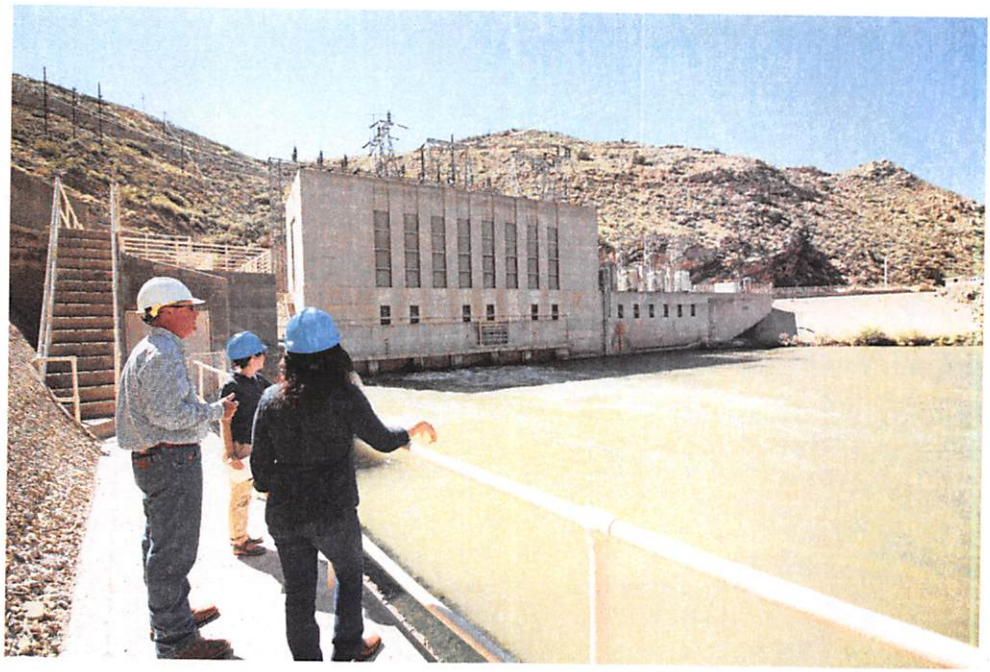
In King's ideal world, water management schemes would reflect the connection between surface and ground water. And water management wouldn't get blown off course by political winds. "I think the handling of water policy, in terms of both promulgation and implementation, needs to be de-politicized," he says. "It needs to be based much more on science, hydrology and the hydraulics of the system, rather than on politics."

Then, rather than each sector—agricultural, municipal and industrial—fighting over every last drop of water, solutions could emerge. And so, too, could changes that protect the river and groundwater system, the economy and people's futures.

'We're going to do everything we can'

At Elephant Butte, Reclamation runs the Rio Grande Project, delivering water each year to EBID, Texas and Mexico. The agency made it through this year, getting water to downstream users, even with record-low spring runoff. Elephant Butte, and other reservoirs, did their job, spokeswoman Mary Carlson has pointed out, (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) storing water from wetter years in the past. Meanwhile, the agency will continue refining its tools and technologies for modeling, forecasting and water delivery to figure out how to make it through next year, and the years after that.

"As you get stressed, you have to look for those outside-the-box ideas," says Yvette Roybal McKenna, with Reclamation's Water Management Division. "We have to find the optimum path so we can move forward and adapt." She says she can't accept a future where the project fails to deliver water. "We're going to do everything we can."



Reclamation has also been studying climate change and its effects on the Rio Grande Basin, which supplies drinking and irrigation water for more than six million people.

Between 1971 and 2001, average temperatures in the Upper Rio Grande Basin increased by an unprecedented 0.7 degree Fahrenheit per decade, or double the global average. And they're expected to rise within the basin by an additional four to six degrees Fahrenheit by the end of the 21st century.

Those rising temperatures will cut the amount of water flowing into the system, as well as the timing of those flows, according to a 2013 report from Reclamation about the impacts of climate change on the Upper Rio Grande Basin. At the same time, more water will evaporate from reservoirs. And plants—forests and crops—will demand more water to survive. All of these factors together, according to the report, "are expected to cause significant changes in the available water supply and demand."

A 2016 Reclamation report also notes that the rivers flows are already insufficient to meet the basin's water demands, and the basin already experiences water supply shortages, even without the effects of climate change.

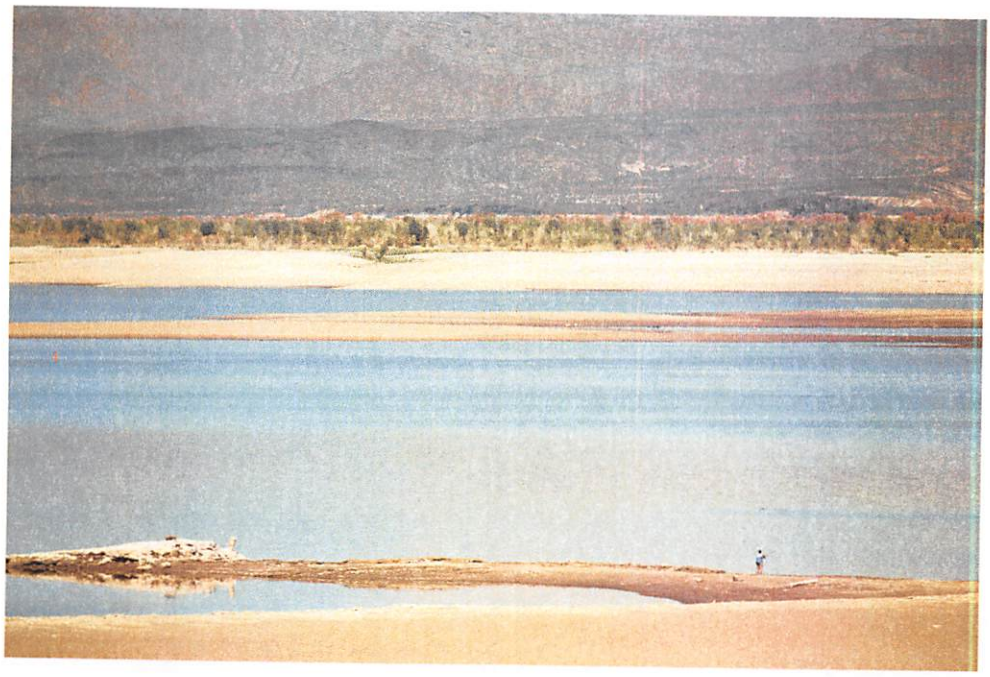
Elephant Butte is 'out of date'

One idea to keep more water in canals and pipes, as well as in the Rio Grande itself, is to stop storing water at Elephant Butte.

"Keeping water in Elephant Butte is a practice I think is out of date, and not wise," says Jen Pelz, an attorney for WildEarth Guardians. Located in southern New Mexico—an arid environment that keeps getting warmer—Elephant Butte Reservoir loses an enormous percentage of water each year to evaporation.

Rates of evaporation vary depending on humidity, wind, radiation, temperature and the amount of water actually in the lake. According to a 2004 report (https://nmwrri.nmsu.edu/wp-content/uploads/2015/research/rfp/studentgrants03/reports/herting.pdf) from New Mexico State University, evaporation from Elephant Butte can be up to one-third of the average inflow each year. Between 1940 and 1999, when inflows to the lake ranged from 114,100 acre feet to more than 2.8 million acre feet per year, annual evaporation averaged about 250,000 acre feet of water.

Warming will only accelerate Elephant Butte's evaporation rate—by another ten percent, according to Reclamation's 2016 report.



That means it's time to change where water is stored on the Rio Grande, says Pelz.

WildEarth Guardians wants the National Academies of Sciences to evaluate existing reservoirs in the basin and run models of how the system would function if water were stored in different places, such as in upstream reservoirs with lower evaporative losses.

Storing Rio Grande Project water—the water in Elephant Butte that Reclamation has to deliver to EBID, Texas and Mexico—in higher-altitude reservoirs would could save between 40,000 and 85,000 acre feet a year from evaporating, according a report from WildEarth Guardians called "Rethinking the Rio." (http://www.rethinkingtherio.org/executive_summary)

Changing where water is stored would mean renegotiating parts of the Rio Grande Compact of 1938. And since federal laws passed during the twentieth century lay out the rules for reservoir operations and water storage, Congress would need to take action.

"People have been talking about reservoir re-operation for a long time, but no one talks about how you do it," she says. "You have to deal with the compact, deal with the reservoir reauthorizations, deal with accountability along the river." If water were stored higher in the system, for example, downstream users would need to know their upstream neighbors weren't diverting their water unfairly.

Making these monumental changes demands building trust and relationships within the watershed, says Pelz. But New Mexico's vulnerability to climate change—revealed so clearly this year—should motivate everyone to start doing things differently.

"For the middle valley and in the south, [managers] delivered all the water for irrigation this year," Pelz says, "And if the reservoirs can't be filled up over the winter, there will be no water for next year."

That's a crisis, Pelz says, for the Rio Grande and for the people who depend upon it.

"Taking concrete steps to do something different means sacrifice: The reality in New Mexico is there are going to be sacrifices, areas that get dried up, and people have to change the way they make a living," she says. "That's the reality of the climate-changed world we live in."

This story is the second of a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters. Read Part 1 (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) ***here. You can also read all of our past coverage of the Rio Grande*** (http://nmpoliticalreport.com/tag/rio-grande/) ***and the Texas v. New Mexico & Colorado litigation*** (http://nmpoliticalreport.com/series/texas-v-new-mexico-scotus/)**.**

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February 10, 2017
In "Environmental Project"

Comments

2 comments

Good Afternoon, I am Denise Barrera, General Manager of Sierra Electric Cooperative, Inc. headquartered in Elephant Butte New Mexico. Sierra Electric is a member owned rural electric cooperative serving over 3,150 (including City of T or C) members with 4,192 meters. We serve Sierra, Catron, Socorro and Luna counties. 99% of our meters are in Sierra County. We have about 900 miles of line with a density of 4.65, which is meters per mile.

Rural cooperatives have seven cooperative principles that they go by, one being "Concern for Community" – which is one of the highest concerns for SEC, including the economic needs of the members and residents of Sierra County. The NMCC will enhance and provide a unique opportunity for growth and sustainability to the Sierra County residents, surrounding counties and the state of New Mexico. It will offset the existing weak economic conditions our county is currently facing. It will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable critical services for its citizens.

In 1982 when Quintana Mine came on line for a short period, our purchases went from 18.2 million kwh in 1981 to 47.5 million. That is an increase of 29 million kwh. And that was for just a few months of operation.

The NMCC, with a 40MW load at 90% LF would increase our purchases from 65.4 million kwh to 263 million kwh. We are looking at approximately 197 million kwh per year. This would benefit the economic and financial conditions for our members of SEC by reducing the burden on our current rate payers, which 81% are residential. It would allow us to maintain and upgrade our system and infrastructure without having to increase rates or borrow funds and open up opportunities for additional economic development projects.

The SEC Board of Trustees adopted a board resolution in ~~January~~ FEBRUARY 2016 supporting NMCC for its investment and efforts in the development of the Copper Flats Mining Project in Sierra County. Over two years later, we continue to strongly support this unique opportunity for growth and sustainability to Sierra County and state economics.

On a more personal note – I have lived here practically my whole life. I graduated from HSHS. I started my career at SEC. I left in 1987 for a better job. The last 22 years of my 36 years in the electric cooperative business, I drove every day to Deming for work. While working in Deming, I never moved out of Sierra County. I have served on numerous boards and committees. One of which I served 12 years on the local school board. As a member of the School Board, I handed out hundreds of diplomas to graduating students knowing the majority of these kids were going to leave Sierra County for better career opportunities. And those who remain in Sierra County are faced with higher cost of living and lower wages. My son and his classmates graduated in 2004. My son is in Yuma, AZ, he has fellow classmates in Las Cruces, Albuquerque, Santa Fe, Dallas, Nashville. And this is just a few. I could go on for hours on what this mine would do for our community. But in closing, NMCC has demonstrated their commitment to Sierra County. They have already invested millions of dollars in this project. I ask that you please approve the Groundwater Protection Discharge Permit.

Thank you for giving us the opportunity to support NMCC and Copper Flat Mine.

#01-02-2016

BOARD RESOLUTION
Sierra Electric Cooperative, Inc.

A resolution supporting New Mexico Copper Corporation for its investment and efforts in the development of the Copper Flats Mining Project, located within the confines of Sierra County, which will enhance and provide a unique opportunity for growth and sustainability to the Sierra County and state economies.

WHEREAS, the Sierra Electric Cooperative is a Member owned, rural electric cooperative serving over 3,150 members with 4,142 meters in Sierra County and whose mission is "to provide the highest quality electric service, at the most affordable price, and in the safest manner" to our members; and

WHEREAS, the Sierra Electric Cooperative Board of Trustees "SEC Board" has reviewed the information developed under the management of the Las Cruces District Office of the Bureau of Land Management, Draft Environmental Impact Statement and finds it to be comprehensive, complete, and protective of environmental resources while providing economic opportunity for Sierra County and New Mexico, as presented; and

WHEREAS, the "SEC Board" recognizes the importance of regional economic development; and

WHEREAS, one of the Cooperative Principles that guides Sierra Electric is "Concern for Community" and the economic needs of the members of the Cooperative and the residents of our County are of the highest concern; and

WHEREAS, Sierra County is endowed with natural resources including copper which is an important industrial element used in infrastructure development, electrical power generation and transmission; and

WHEREAS, it is the desire of the SEC Board to promote the economic utilization of Sierra County's natural mineral resources in a responsible fashion that will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable important critical services for its citizens; and

WHEREAS, the economic base of Sierra County will be enhanced through the development of the Copper Flat Mine Project to help offset the existing weak economic conditions being experienced in Sierra County; and

WHEREAS, it is the desire of the SEC Board to support businesses that employ local citizens and utilize proven technologies that provide community safeguards and balance environmental stewardship with mineral and other natural resources production.

NOW THEREFORE, BE IT RESOLVED, that the SEC Board fully supports and encourages the granting of state and federal permits to the New Mexico Copper Corporation as needed to facilitate the opening and continuing operation of the Copper Flat Mine Project in Sierra County.

CERTIFICATE OF SECRETARY

I, O. L Wood, hereby certify that I am the Secretary of Sierra Electric Cooperative, Inc. and I further hereby certify that the above Resolution is a true and correct copy of the resolution passed and adopted by the Board of Trustees of Sierra Electric Cooperative, Inc., at its meeting held on February 19, 2016, at which meeting a quorum was present, and that this Resolution has not been rescinded or modified.

SIERRA ELECTRIC COOPERATIVE, INC. NO STOCKHOLDERS SEAL (SEAL) LIABILITY NEW MEXICO

O L Wood
O.L. Wood
Secretary

I get the impression that some people think this is the first mine in NM

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have. Nevertheless we are still here, and the area is still beautiful

It's time that our business community realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community?
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the baseless fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting opportunities to improve our economy slip away.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer so most of our young people moved away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all, they start with an outright lie and go on to embelish that lie.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and to be an anti hero.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.
That's partly because Sierra County is so very poor, one of the poorest in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Statement

My name is Robert Byrd, I am a retired engineer living in Las Cruces. My mother's family is from the old Hot Springs area, now T or C, my father worked in mining in New Mexico at Magdalena, and later Grants before moving out of state. I was afforded my own educational opportunities thanks in great part to my father's work in mining.

My concern is that opportunities for today's youth in southern New Mexico are seriously limited by the lack good-paying job opportunities that invest in their communities, which in turn affects the ability of communities to adequately fund education, and pay for infrastructure upkeep, a deadly cycle. Farming is important, but work is seasonal, and generally low paying. Government jobs are often good, but can be easily moved as political winds shift. New Mexico, with its low education rating isn't even close to the first choice for relocating high-tech industry. The Spaceport? Mañana- So why not mining? We have the resources- that other states don't have, we have institutional excellence at New Mexico Tech, and we have a willing workforce that needs high-paying jobs with a future.

I commend New Mexico Copper for their planned mine at Copper Flat. New Mexico has mineral resources that can, and should be developed in a sustainable fashion that are entirely compatible with other important economic activities- farming, tourism, manufacturing, as well as the high-tech fields.

The technical plan that New Mexico Copper has presented details how much water it will use, and how it will be managed. This isn't exotic, untried, or especially expensive technology- but it is modern, and represents the state of the art in an industry that deals with the same concerns across the world. I made some quick comparisons with the water that will be used in the Copper Flat operation, which is equivalent to the same amount of water consumed by a large pecan farm covering two sections of farmland. But the "social benefit" return on that water use in mining vastly dwarfs that in pecan farming- in terms of good paying jobs, local business rejuvenation, tax revenues and potentially follow-on support industries.

I strongly support approval of the necessary permits for the Copper Flat mine.

Statement for the City of Elephant Butte for the New Mexico Environment Department, Groundwater Protection Bureau

for the

Copper Flat Mine Project Groundwater Protection Discharge Permit

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The City of Elephant Butte became New Mexico's 101st incorporated community in July 1998, and is home of about 1,500 full time residents, and hosts as many as 100,000 on key summer holidays that visit New Mexico's largest lake, Elephant Butte Reservoir. In the City's 20 years of existence, we have striven to develop a friendly, safe and diverse community that is open to tourism and a comfortable retirement environment. - County's population overall is going down

20 years
FB PIX
comments
surrounding
states
Impact
on our
area??

As with much of New Mexico, particularly Sierra County and other rural New Mexico counties, maintaining a sustainable City infrastructure has been challenging since our inception, with poor economic conditions state-wide, and a lack of good paying, full-time jobs in Sierra County. With much of our county being Federally-owned, and other large private land holdings, the opportunities for economic development are constrained and challenging.

need
Industry

While we remain hopeful that Spaceport will someday soon develop and provide the economic stimulus that we have been waiting for since its official opening in 2011, this has not yet happened on a scale that has much effect on our economy.

In addition, the drought plaguing New Mexico over the past years, as well as political pressures to provide more and more water to the Mesilla Valley for increased agricultural acreages, as well as to the more water in the Rio Grande River system to the State of Texas and to Mexico, Elephant Butte Lake is currently only about 3% of its holding capacity. This has resulted in fewer visitations to Sierra County and Elephant Butte than virtually any year in our City's existence. This of course increases pressure on our local businesses, and we have seen some of them closing their doors.

While some opportunities can be developed in a variety of geographic locations, a Mineral Deposit must be developed where it occurs. You cannot relocate Ore Bodies.

The Copper Flat Mine Project offers a unique and valuable opportunity to the City of Elephant Butte, to Sierra County and to the State of New Mexico. The Copper Flat Project job opportunities are the kind that communities can build on. Currently, we lose many of our young, bright high school graduates, leaving our communities to education and job opportunities that are not available here. Copper Flat will provide nearly 300 full-time jobs, many of which will be entry level or well suited to many of our local skilled individuals that can operate heavy equipment, drive trucks, work as accountants, engineers, human resource specialists, Safety Professionals, Environmental Professionals, and many, many other opportunities.

These people will live in our communities, and spend their good paychecks on their daily family needs such as food, clothing, vehicles, gasoline and diesel, on an on. They will also pay Federal and State taxes; as well as contribute significantly to the Gross Receipts Taxes that our local municipal and county governments rely on to provide services to our communities.

Like a city or a county or even a state, when a major project is needed, it must be designed and built by qualified professionals. So too does a mining company like New Mexico Copper Corporation (NMCC). NMCC has engaged an impressive assemblage of Professional, Licensed and Experienced Engineers, Hydrologists, Metallurgist's, and others to develop the plans for the proposed facilities for the Copper

Flat Mine Project. Once approved for construction, there will be many opportunities for our local construction companies to play a role in the construction and development of the Copper Flat Mine Project.

Our city, our county and our state all need the Copper Flat Mine Project! The company has done its part, has professionally waded through the myriad of requirements, hired the best they can source to design the facilities so that they will be protective of the Environment during operations and well into the future.....something that was considered in the past. They will also post a significant Bond to assure that the operation and infrastructure is protective during operations and in the future.

We must seize this opportunity for our residents, our communities and for our future. What else to do we have to support our future? Our lake may never reach levels that it has in the past? Spaceport is a great opportunity, but when will it happen for Sierra County?

Without the Copper Flat Mine Project, our future and sustainability of our communities will be a difficult and challenging at best.

The City of Elephant Butte needs and supports the approval of the Groundwater Protection Discharge Permit for the Copper Flat Mine Project, and encourages the New Mexico Environment Department to complete their analysis and issue this permit as soon as possible!

Date 9/26/18

TO: HEARING CLERK
JOHN BACA
ON HEARING BEFORE THE SECRETARY OF ENVIRONMENT

DOCKET No. 8WB-18-06(P)

SUBJECT: IN THE MATTER OF DISCHARGE PERMIT #1840 FOR COPPER FLAT MINE

NAME: LARRY BROOKS desertlb@mac.com
LAS CRUCES & KINGSTON, NM

I AM A NATIVE NEW MEXICAN & LIFE LONG RESIDENT. WORKED IN NM MY WHOLE LIFE. SPENT 37 YEARS IN THE COATINGS INDUSTRY. I HAVE TRAVELED THE ALL OF THE STATE HIGHWAYS FROM JAL TO FARMINGTON CLOVERDALE TO DES MOINES, AND ALL POINTS INBETWEEN. I WORK PART TIME - TRAINING CONTRACTORS IN ROOF COATINGS & REPAIRS. ONE TYPE OF ROOF THAT WE CAN REPAIR IS "SINGLE PLY" (TPO, PVC, EPDM). IT'S SIMILAR TO THE LINING TO BE USED IN TO PROPOSED TAILING POND. THE SINGLE PLY ROOFS ARE USED ON LARGE ROOFS LIKE A WALMART. OFTEN WHEN A ROOF IS COMPLETED THERE WILL BE A FEW LEAKS ON THESE ENGINEERED SYSTEMS WITH PROFESSIONAL INSTALLATION. LEAKS CAN BE LOCATED & REPAIRED BUT CAN CAUSE A LOT OF DAMAGE & MAY HAVE GET MILDEW & BLACK MOLD. THE LEAK MAY

LOCATED & FIX. IF A LINER IS USED AS PROPOSED & FILLED & COVERED WITH THOUSANDS OF YARDS, TONS OF MINE TAILINGS & CRUSHED ROCK & WATER. SHARP ROCKS WOULD PUNCTURE THE LINING AND LEAK. MONITORING WELLS PROPOSED WOULD DETECT THE LEAK. SINGLE PLY SEAMS & PUNCTURES COULD BE REPAIRED. BUT HOW WITH TONS OF FILL & MILLIONS OF GALLONS OF WATER.

WE ARE TAKING WELL WATER & MAKING INDUSTRIAL WASTE & HOPING THE LINER DOES NOT LEAK. HOW CAN IT BE REPAIRED? REMEMBER THE LINER IS UNDER TONS OF TAILINGS AND MILLIONS OF GALLONS OF WATER WHICH ADDS HUGE AMOUNTS OF WEIGHT & PRESSURE. WHEN THIS LINER LEAKS WITH THE NEW INDUSTRIAL WASTE WATER, POLLUTED WATER, WHERE DOES IT GO? I'm FOR JOBS IN THE AREA. HOWEVER, IF THE WATER IN GROUND IS POLLUTED WITH INDUSTRIAL HAZARDOUS WATER. IF WE POLLUTE THE AREA AROUND THE MINE. WHAT IS THE COST to WILDLIFE LIFE, PLANTS, HUMAN LIFE? WHAT WILL THE NEXT GENERATION HAVE IF THEIR IF WATER IS NOT FIT FOR DRINKING?

PLEASE DENY THIS DISCHARGE PERMIT.

= = WATER IS THE BLOOD OF LIFE.

Larry Brooks

18808

BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

Wednesday, September 26, 2018,

My name is Michael Skidmore. I am the owner of Butte Propane Company and I am here today to express my strong, unwavering and total support for the Copper Flat Mine.

Sierra County is my home. I moved here 35 years ago in 1983 from Oklahoma. At that time the copper mine was in full operation, providing good paying jobs for our county residents and much needed tax revenue for our state and local governments. Many other secondary businesses and jobs were also supported by the mine as they provided services and goods to the mine.

When the mine closed in 1985, the economic impact to the county was drastic! Jobs were lost, businesses closed and people moved away. Real Estate prices plummeted. The county experienced a depression it has never recovered from to this day.

What THEMAC Resources is asking is not a new mine in the sense that none has ever existed in our county before, but rather that we utilize the already existing resources that have been successfully mined in the past!

THEMAC has met or exceeded all mine safety and environmental codes and they own their own water. There is no valid reason to deny them the right to operate on land they own.

I see several obvious reasons the mine should be operating.

FIRST: The economic impact to our local community, and indeed, the state government in Santa Fe is obvious! Almost 400 full time, permanent, high paying jobs will generate much needed income for all! The taxes the mine will pay to the state, as well as the taxes paid by the employees will be substantial.

SECOND: Instead of a dying county with aging residents slowly reducing the population, our children can stay in Sierra County and infuse it with new vibrant energy and life.

THIRD: Those who oppose the copper mine are biting the very hand that feeds them! 90% of the automobiles we drive are made from mined metal ores, steel, aluminum, silver, copper, titanium, etc. Those who advocate for electric cars but oppose copper mining are opposing themselves! One can't have cars without

copper! Those who advocate for wind energy but oppose copper mining oppose themselves! Wind turbines need copper, where will the copper come from? A mine! Those who advocate for solar energy surely must realize that solar is impossible without copper!

Computers, cell phones, Televisions, cameras, video equipment, literally every field of technology is dependent on a secure, safe and continuing supply of copper! The demand for copper continues to escalate! In addition to the technical fields' dependency upon copper, our nation's power grid, electrical generating stations, power lines, electrical wiring for homes and businesses all need copper! Even my propane business needs copper for the regulators and tank tubing!

As new technology advances, the need for copper will only increase! It will not decrease!

When America is forced to import copper from other countries to supply the growing demand, not only is the cost increased, our national security is threatened. A country could simply cut off our copper supply and America would grind to a halt!

What good is a valuable natural resource if we are not allowed to use it?

Why not use a resource that is local, less expensive to mine, provides great paying jobs, much needed tax revenues and advance the technological age we live in?

Do everyone a favor and open the mine!

Madam Hearing Officer, I appreciate the opportunity to comment.

My name is Crystal Diamond, I am the director of Sierra Soil & Water Conservation District, a division of state government governed by a board of officials elected by all registered voters within their district boundaries, in our case Sierra County, Socorro County, Catron County, and parts of Dona Ana County.

By state statute, our district is charged with furthering the conservation, development, utilization, flood prevention and disposal of water, and thereby preserve and protect New Mexico's land and water resources.

Earlier in testimony, a representative from Turner Properties spoke of the protection and conservation measures implemented on the Ladder Ranch. The term *pristine water* was reference throughout. Ironically, it was our district and community landowners that seemed most concern for the water quality of Animas Creek when just 4 years ago, the ranch proposed the poisoning of our creek waters, including Rotenone, to kill out all fish inhabiting our steam in an effort to introduce the rio grande cutthroat trout. The poisonous waters would reach Caballo Lake, effectively killing fish species the ranch classified as undesirable, additionally, it was not disputed that protected species such as leopard frogs within the waters would be killed in the process. Impacts to irrigation and livestock waters were unknown, and the community push back was extreme. The project was abruptly halted when federal judges ruled the cutthroat trout did not warrant protected species designation. A ruling that pleased many within sierra county, specifically residents along Animas Creek, who were not pleased at the attempt made by their upstream neighbor to poison their water.

Our orders to promote sustainable conservation through multiple-use practices is a mission we take very seriously, therefor we were not quick to support the opening of Copper Flat mine without first being confident that our land, water, air and wildlife would not be negatively impacted.

Like the Ladder Ranch proposal, the conservation district was equally concerned about the impact Copper Flat proposal would have on our natural resources, specifically water quality. We have carefully reviewed the proposals and studies and called numerous meetings with copper flat representatives, including on-site visits. Our concerns and the concerns brought to us by the many farmers and ranchers we serve, have been thoroughly addressed and alleviated. We are confident that the mine has put in place measures of adequately protecting our waters and land.

It appears the effort to stop the opening of Copper Flat Mine, is not based on genuine concern for the environment. The opposition seems spearheaded in attempt to protect profits generated from an eco-tourism business that relies on "quiet open spaces and views". Sierra County welcomes this business. Just as we welcome the business opportunity of another- to use the land responsibly and wisely, generating profits for themselves while conserving the lands for future land steward.

This mining project has met what is required of them. We urge for their permitting to be granted. Together with the overwhelming majority of our citizens, Sierra SWCD stands in full support of Copper Flat Mine.

Madam chairwoman and all other interested parties in these proceedings, my name is TED CALLAWAY live in Hillsboro NM. According their websites, Themac and NMCC are exploration and development corporations. It is my belief that it is their intent to sell the mine property, which is well within their rights. However, if that is their intent then there is no need for a discharge permit. If they want the permit as part of their development strategy and for marketability I believe that the law prohibits the government from enriching private entities with actions of its own doing. That is, the mine should be saleable as is, if not, then the permit is adding prohibited valuation. Further, if their intent is to actually operate the mine I would like to point out that neither company has any history or experience in operating a mine. As we all know, environmental damage is a probability with all mining operations. To allow inexperienced operations magnifies that potential to an unacceptable degree.

So, on these two points, non-governmental participation and inexperience, I ask that the discharge permit be denied. Thank you.

Ted Calaway

10634 Highway 152

Hillsboro NM 88042

Sierra Electric Cooperative, Inc.

610 Hwy 195 • P.O. Box 290 • Elephant Butte, New Mexico 87935
575-744-5231 • Fax: 575-744-5819
www.sierraelectric.org

Copper Flat Mine Groundwater Discharge Permit Hearing

Testimony of:
John Bokich
President, Board of Trustees
Sierra Electric Cooperative
PO Box 290
Elephant Butte, NM 87935

28 September 2018

- John Bokich, President of the Board of Trustees for Sierra Electric Cooperative
- My background includes:
  - Bachelor of Science and Master of Science degrees in Biological/Ecological Sciences from the University of Texas at El Paso
  - Certified Wildlife Biologist
  - Licensed Contractor in NM
  - Certified MSHA Safety Instructor
  - Certified Auditor, International Cyanide Management Institute
  - 36 years experience as an Environmental Professional in the Mining Industry
    - 8 awards for Excellence in Reclamation, including one in British Columbia and one in New Zealand. Six in New Mexico.

- Sierra Electric established in 1941, now in our 77th year of serving Sierra County
    - About 4,000 members
  - Challenges of an Electric Coop in Southern Rural New Mexico
    - Declining Membership with declining population in Sierra County
    - One of the poorest Counties in New Mexico with a stagnate to declining economy and little Industrial electrical load
    - Aging infrastructure with constant need for replacement and upgrading.
      - Nearly 900 miles of power lines (3 lines - ~3,000 miles of wire)
      - ~14,000 Wood Power Poles
      - Approximately 3,300 Transformers

- Approximately 600 Regulators, Capacitors, Sectionalizing Devices, etc.
- 2 Substations (Cuchillo (1977): 10 MVA / Caballo (2005): 5 MVA)
- A fleet of specialized vehicles, equipment and Safety gear

▪ Primarily a Residential Customer Base, the most difficult type of Base for sustaining infrastructure and service without continually needing to increase rates to Members

▪ Difficulty finding skilled workers, rely on hiring bright locals and providing professional training and then trying to retain them

- Problem with being in an economically challenged County is that we can't pay as much as other Coops with better economies.

o Electric Coop's, like mining operators, rely on professionals to design and construct our infrastructure

▪ Sierra Electric has ongoing requirements to upgrade and replace our aging infrastructure as described above

▪ For large Capital Projects, after they are Professionally designed, it goes to Bid, and is constructed by Licensed Professionals specialized in electrical projects.

▪ Once construction complete, our own highly trained and specialized Linemen and Support Crews monitor and maintain the system, and conduct Maintenance and New small scale Construction Projects.

▪ NMCC has done the same with design of their mine facilities, including the Tailings Storage Facility. It has been designed by **Professionals,** with extensive **Experience** in such operations and facilities. These Professionals rely on their designs and constructed facilities working to protect the environment in order to stay in business.....as will NMCC!

▪ Sierra Electric Cooperative is a Working Example of how when good opportunity for good employment is available in Sierra County, that our local youth, and talented individuals who may be from other areas and like living in Small Town New Mexico, seek out these jobs, work through intensive and professional Training Programs, and improve themselves and build Careers in Sierra County.

▪ This results in Growth to the County, which is what Sierra Electric needs to sustain and improve our service to our Members.

o We have heard a lot of talk this week, opinion, not fact, about the effects of mining on a community.

▪ It is too bad that mining is such a rare industry in New Mexico these days. Mining is a wonderful and unique industry. It is much like a Family as how employees and families feel like member of a Team.

▪ Mining folks work, live and share their lives with Workmates, and establish relationships that last a Lifetime.

▪ Mining is an incredibly Complex, Technical and Potentially Dangerous industry.

- Mining has and continually upgrades a CULTURE OF SAFETY.
  - Like an Electric Cooperative…SAFETY IS NUMBER ONE!
  - Before you are hired, you will be required to take and pass a Drug and Alcohol Test, and Drug Tests will likely be given randomly through the year, or to any individual that has an accident on the mine that could have, or does result in injury to an employee or equipment. This is to protect our Workforce from someone who might come to or be at work in an impaired state.
  - A new employee will go through 24 hours (3 full workdays) of specific training by an MSHA Certified Instructor. All employees work together in these Training Classes…..Administration such as Receptionist, Accountants, Human Resources are in the same Safety Training Class with Haul-Truck Drivers, Bulldozer Operators, Mechanics and Mill Workers. You will receive full pay for any training that you take for Safety, or that is required by your job.
  - Every 12 months every employee must have an 8-hour Refresher Class to be Recertified to work at the mine.
  - SAFETY TRAINING, is not the end of your exposure to Safety at a mine. Every day before starting work, you will have a Safety Tailgate Meeting with your Crew to discuss the day's work plan, any special hazards or conditions that should be avoided or repaired, and more time and site-specific information to ensure that all employs are on the same page.
- In addition, Task Training will be required before anyone, even an experienced Operator, demonstrating that they know how to Safely operate a piece of Equipment.
- Task Training will also be continually offered to inexperienced employees so that they can learn Safe Operating Practices and be available for Promotion.

  - MSHA Safety Training, and the Safety Culture that will be practiced and required at the Copper Flat Mine will make you a Safer Person in all aspects of your life.
    - You will take home your Safety knowledge and culture and integrate it into you family life.
    - No-one in your family will ride in a moving vehicle, not even 50 feet, without buckling your seat belt.
    - You will be proveded PPE (Personal Protective Equipment), e.g. hard hat, reflective vest, hearing protection, eye protection, etc., by the Company. You will likely purchase your own steel-toed footwear.
    - You will teach your family the importance of using PPE around home for chores, and you will likely prepare and keep a kit in

your vehicles for emergencies.....blankets, water, food, tools, etc. You and your family will be prepared!

- As I said previously, a mine functions as a Team. Equipment Operators, Admin Staff, Mill Operators, Engineers, Environmental Dept., Safety Dept., etc., will all function together to operate the mine in a Safe and Planned way.
- The Mine Team will consist of:
  - Admin Staff..... Receptionist, Accountants, HR, etc.
  - Operations....Equipment Operators, Mill workers, Road and Infrastructure Maintenance, Blast Hole Drillers, Blasters, etc.
  - Operations Support....Environmental/Reclamation, Drainage Control, Mine Geology, Surveying, Grade Control, Warehouse, Equipment Maintenance (Heavy Equipment), Mill Maintenance, etc.
  - Management.....General Manager, Dept. Heads, etc.
- The Mine Team is made up of women, men, Hispanics, Blacks, Native Americans, Asian and any other persons legally able to work and live in Sierra County.

- I have been a land-owner in Sierra County, through my parents, since 1961, when they acquired a lot at Hot Springs Landing at Elephant Butte.
  - I was 10 years old when we "got out lot", and in the ensuing 57 years, I was a regular visitor to the area. In 2005, my wife and moved here full-time, and in 2016 I retired here.
  - I have seen many changes Sierra County since 1961, and few are positive. TorC was a thriving place, people were working, stores were open and diverse, things were happening.....good things, and our newspapers weren't full of photo's of people who had been arrested for drugs, murder, robbery, etc.
  - While Tourism is an important component of the future economy of Sierra County, it cannot carry the county on its own, as Sierra County's economy demonstrates.
    - Tourism jobs tend to be Seasonal, Temporary, with little to no Benefits, while Copper Flat jobs will be full-time with Benefits, Training and a future.
    - Tourism in Sierra County centers primarily around Elephant Butte Reservoir. Our lake level is currently about 3% full, as low as it has been in has been in about 50 years. A year ago the lake was about 12% full. With inflow in late 2017 and in 2018, the lake was reduced by 9%. If we don't have a large snowpack in 2018/2019, what is going to happen? Will the lake be at 1% full? Or 0% full. How is that going to affect Sierra County's tourist economy?
      - With ever increasing acreage of pecan trees being planted, a high water-use crop, and desert/riparian lands being converted to cropland, the issue of water with Texas and Mexico, will Elephant Butte ever again be a lake that is the engine of tourism in Sierra County?

- I spent 36 years working in the Mining Industry as an Environmental Manager at several mines in New Mexico, Nevada and Overseas.
    - One notable observation that I had in working at large mine sites over the years is that wildlife species are not driven away by mining, but attracted! Game that is hunted learns that a mine permit area is an area of protection as MSHA does not allow hunting/firearms on mine areas. In addition, many species learn that there are unique habitat opportunities on mine areas. I have noted Rock Wrens actively foraging for insect on recently blasted rock slopes, within minutes of a blast taking place. In addition, active mining areas as well as mine reclamation areas offer diversity to the habitat from surrounding areas, which draws in many species, short and long term.

- As an Environmental Professional in Mining, I have seen and been an Active Member of Mine Teams to plan and manage the construction, operation, environmental management, closure and reclamation of several large Tailings Storage Facilities, Heap Leach Pads and other mine facilities that have similar construction objectives and used the same techniques and materials as those proposed for the Copper Flat Mine.
- I also managed an Environmental Auditing program for a Gold Company, and conducted Environmental Audits on gold mines in the US, Canada, Chile, Brazil, Zimbabwe and Russia.
    - Many of these mines were aged, and yet the tailings facilities and systems were designed, built and operated to rigorous standards, and were protective of the environment.
    - I have never known of a project that I was involved with, that was designed, constructed and operated, as is proposed at Copper Flat, to have failed.
    - The Copper Flat Mine Project has been designed with the most advanced and proven technologies known today, and will use the most advanced and proven materials to protect the environment while providing jobs, training and opportunity to our local youth and working people, and economic stimulus to Sierra County.

- The design, construction and operation of the Quintana Mine in the late 1970's and early 1980's was in a totally different era of mine and facility design, and consideration of the environment, and our science has advanced significantly since that time.
    - When Quintana constructed the Tailings Storage Facility, it only had a clay-type liner and little else to prevent migration of fluids and tailings constituents into groundwater.
    - The result was a relatively small plume of water that did percolate from the TSF into the groundwater below and downgradient of the TSF.
    - I have reviewed data taken from monitoring wells that intersect this plume.
    - While the groundwater samples from the monitoring wells does have some elevated values for some constituents, primarily TDS and Sulfate, the values are not really very high, and there were no samples that showed copper as being above Standards!

- In contrast, in a report published by NM Tech in 2013, samples taken of water discharged from the TorC Hot Springs District, directly into the Rio Grande River at a rate of about 1 million gallons per day show some sulfate and TDS concentrations well above Human Health Standards.
- In addition, thousands of tons of ammonium sulfate fertilizer is applied to the crops in the Mesilla Valley, which borders the Rio Grande River south of the Copper Flat Project.
    - A paper in the publication Chemical Geology in 2011, which studied sulfate levels in the Mesilla Valley, concludes that fertilizers containing sulfate were major contributors to elevated sulfate in groundwater, down to depths of as much as 600 feet.
- Also, water samples reported by the US Geologic Survey in 1998 for the years 1992-95, showed elevated levels of many pesticides and volatile organic compounds and nutrients, which were detected in surface and ground waters of the Rio Grande Valley. With the significant increase of croplands since 1995, what are those values today?

- I find it hypocritical that there is criticism of Copper Flat potentially affecting groundwater quality....historically shown to be sulfate and TDS, when there is residue of nitrogen (nitrates) and sulfate that leaches into the groundwater of the Mesilla Valley in much greater quantities.
- In addition, there has been criticism of the design of the TSF and the materials to be used, HDPE in particular. HDPE is used extensively to protect groundwater and the environment. Hazardous Waste Landfills, gold mines containing solutions containing cyanide, and many others utilize this material. HDPE is estimated to last 500+ years. In this application, where there is a compacted sub-base and the HDPE liner is protected from excess pressures by the solution drainage system and from UV light by the covering of tailings, it could well last in perpetuity.
    - And who is to say that the Elephant Butte Dam, which is already 100 years old, is going to last 500+ years, or if it is, that the lake won't be virtually full of sediment with little or no water storage capacity? Without the Elephant Butte Dam, agriculture in the Mesilla Valley will be a remnant of the past.

- NMCC has followed the path that federal and state regulation require, they have engaged highly trained, experienced and professional teams to design a comprehensive project that will protect the environment, generate much needed opportunity and economic benefits to Sierra County, and reclaim the land to a condition better than what it is today.

IT IS TIME TO APPROVE THIS PROJECT AND LET THOSE IN SIERRA COUNTY THAT WANT TO WORK, THAT WANT TO SEE THEIR CHILDREN STAY IN SIERRA COUNTY AND WORK, AND WANT A COUNTY THAT IS ECONOMICALLY SUSTAINABLE, RECEIVE WHAT CAN BE HAD IF THE PORJECT IS APPROVED.

New Mexico Copper Corporation Copper Flat Discharge Permit DP 1840.

My name is Linda Seebach, I live in Hillsboro, NM.

I am opposed to this permit being approved for the following reasons:

I hold a Bachelor of Arts Degree in Social Science from New Mexico Institute Of Mining and Technology (now New Mexico Tech), a Master's Degree In Social Work from the University of Denver, I am a former (now retired) Certified Floodplain Manager (CFM) in New Mexico and also a former NPDES Administrator for the Village of Los Ranchos de Albuquerque NM and therefore am in a unique position to address the proposed Copper Flat Mine ground water discharge permit before you.

I would first like to address the socio economic position of Sierra County. It is true that Sierra County needs jobs and economic income. However, historically, Copper Flat Mine had not been economically viable. Bankruptcy, near bankruptcy, abandonment until sold has been its history. THEMAC and NMCC, who have never operated a mine, would have you believe this is going to change, they have all the answers and history would not repeat itself. This is a projection, not a guarantee.They need $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 12 straight years of over $3.00 /lb. prices.

Secondly, THEMAC and NMCC have put forth hydrological information in a dogmatic position, "This is what is and how it will remain for the next 100 years". They have not addressed the hydrological changes which WILL occur by pumping 7000 + acre feet per year from the aquifer in addition to current usage. Depleting the aquifer by that amount yearly will cause a change in the hydrology of the area. Over a twelve year period, this will be significant.

In their presentation NMCC mentioned briefly a seismology report was required by the OSE, Dam Division, however, there has not been, to my knowledge, a comprehensive study of the effects of the shock waves from blasting over the twelve year production projection and the redistribution of 112 million tons of material within ¼ mile of the Las Animas fault. It is reasonable to question whether the combined mining activities of blasting, machinery vibration, and redistribution of 112 million tons of material would cause fractures in the Las Animas fault and what the results of that fracturing would be.

HDPE liners are considered, for several reasons, always to leak a little (they are specifically said by manufactures to be "water resistant" not "water proof"). The under-drain collecting system

(which normally would be under a top liner to catch the expected leakage) is located above the liner. It is not, in fact, an "under-drain" system, but they still call it that. It is an "above drain" system which functions to capture water directly from the tailings to be reused. Nothing prevents contaminated water that gets past the liner (mostly through accidental punctures, rips, etc. – they have to drive equipment over the liner to install it) from going into the ground and thus into groundwater. This violates the NM Water Quality Act, but the NM Supreme Court sanctioned this violation by saying the Copper Rule's solution to this problem is valid. That solution is to say that if the groundwater is polluted by the tailings pond, that pollution has to be detected by the monitoring wells placed around the TSF, and then the situation is remedied by a network of "interceptor wells" that pump the contaminated groundwater back into the tailings pond thus not letting any pollution downstream. That is why the proposed TSF has neither a real under-drain collection system nor even a leakage detection system.

To respond to these points: a) since NMED knows definitively that the existing tailing pond (which has no plastic liner) is leaking contamination into groundwater and has been for 35 years, NMED should require an interceptor system to operate from the beginning of operations, i.e., it should be in place and not wait until new contamination is detected by the new monitoring wells; b) NMED must verify that NMCC owns enough water rights to operate a sufficient interceptor system; if they don't then the permit should not be issued; c) the location of the so called "under-drain" system does not satisfy the Copper Rule requirement for a tailing pond which specifies a "tailing seepage collection system" [NMAC 20.6.7.22A(4)(d)(v)] because it does not catch the seepage going past the liner into the ground. The Copper Rule itself defines "seepage" as leachates that get into the vadose zone, which is the moist layer of soil above groundwater. The requirement is for <u>under-drain</u> systems.

As a result of climate change, New Mexico has experienced a higher incident of 500 year storm events in the last ten years, two of which have been in the Hillsboro area. In calculating the storm water management portion of the permit, they have devised a "ledge" which would separate NMCC property from BLM property within the proposed pitlake area. In the NM Water Quality Act (NM Statutes Annotated 74-6-1) there is a provision called Limitations (NMSA 74-6-12C) which exempts water that is entirely on private property, that does not combine with other waters, and whose effects are confined to that property. NMCC started resurveyed the land around the pit to show they own all of the pit. However, there is a small portion of BLM land which sticks into the projected future pitlake at the end of operations. The level of the pitlake is going to change according to storm events. The ledge is planned to be three feet above the proposed water level, it will overtop the ledge during a 500 year storm event, as three feet does not allow sufficient freeboard for a 500 year event.

They have not addressed the probability of a 500 year storm which would impact the holding pits of the mine, thus causing the overflow of contaminates into the Greyback Arroyo and on to the Ladder and Hillsboro Pitchfork Ranches. Should the contaminated pits overflow in such a manner, the mine becomes a point source contamination to the Rio Grande River.

In summary, I protest this permit on the grounds of insufficient studies into the above mentioned areas of concern. THEMAC and NMCC are asking you to believe "This is what is, and it will continue to be so". NO it will not continue to be so...there are many variables in the equation that have not been adequately addressed. They are saying, "This is what will continue to be". No, they need to have contingency plans and more detailed analytical studies, instead of their dogma.

Sincerely,

Linda Seebach

Linda Seebach

10634 Hiway 152

Hillsboro, NM 88042

FREEPORT-MCMORAN

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

Baca, John, NMENV

From: Stan Brodsky <stanandrob@windstream.net>
Sent: Friday, September 07, 2018 11:59 AM
To: Baca, John, NMENV
Subject: Copper Flat Mine Re-opening

I am all for adding several hundred jobs to Sierra County, but the price for doing that seems pretty high. I'm talking mainly about water usage. We are in a draught. Wells are going dry in Hillsboro. The mine has said they need to use about 16-17 acre-feet of water per day, which is over 5 million gallons per day. An average family used less than 1 acre-foot per YEAR.

I am also concerned about pollution of the ground water from contaminated water flowing out of the mine operation. As you know, there will be a hearing on the mine's projected water discharge om 9/24 – 9/25. We'll see what NMCC and Themac have to say at that time.

And then there are a couple of less important, but still important, things. One would be damage to the road on route 152 from the very heavy trucks, and then there is also the question of added traffic to route 152 (trucks and workers). As you probably know, Rt. 152 is a 2 lane road, one lane each way, with no shoulders.

Stan Brodsky

Baca, John, NMENV

From: LeRoy Henderson <elhleroy@yahoo.com>
Sent: Friday, September 07, 2018 10:43 AM
To: Baca, John, NMENV
Subject: Fw: THEMAC is still trying to take advantage of you via Bruce Swingle and a few other morons too stupid to see reality!!!
Attachments: Floccinaucinihilipilification.docx

FYI--- get the truth!!!
----- Forwarded Message -----
From: LeRoy Henderson <elhleroy@yahoo.com>
To: Steve Green <steve.green@torcnm.org>; Sandra Whitehead <sandra.whitehead@torcnm.org>; Kathy Clark <kathy.clark@torcnm.org>; Rolf Hechler <rolf.hechler@torcnm.org>; paul.baca@torcnm.org <paul.baca@torcnm.org>
Cc: Max Yeh <maxyeh@windstream.net>; PAWA TO PEOPLE <pawatothepeople@windstream.net>; pawa@windstream.net <pawa@windstream.net>; Stan Brodsky <stanandrob@windstream.net>; Sophia Peron <jazzinn.peron@gmail.com>; Ron Fenn <fenwron234@gmail.com>; Audon Trujillo <audont@yahoo.com>; Ariel Dougherty <arielcamera@gmail.com>; Walter Rubel <wrubel@lcsun-news.com>; Andrew Oxford <aoxford@sfnewmexican.com>; Chuck Wentworth <cwentworth@gpkmedia.com>; Mike Tooley <mike@torcherald.com>; Bruce Swingle <bswingle@sierraco.org>; Kenneth Lyon <klyon@sierraco.org>; Frances Luna <fluna@sierraco.org>; Robin Tuttle <blackrange@yahoo.com>; John Arthur Smith <john.smith@nmlegis.gov>; John Masterson <john@torc.beer>; Jim Taylor <englecowcamp@yahoo.com>; Rebecca Dow <rebecca.dow@nmlegis.gov>; Goodman, Melanie (Tom Udall) <melanie_goodman@tomudall.senate.gov>; Howie C. Morales <howie.morales@nmlegis.gov>
Sent: Friday, September 7, 2018, 10:32:45 AM MDT
Subject: THEMAC is still trying to take advantage of you via Bruce Swingle and a few other morons too stupid to see reality!!!

This is the truth!!! Copper is not up as it has been stated by THEMAC's new marketing and lobbying firm...THEMAC is and has been on the verge of bankruptcy as seen in the auditor's reports for the past 6 years... they have borrowed, at an exorbitant interest rate, more money than they have on hand... they have only two mine properties... they have no mining equipment... they are buying support through paid by them sponsorships (what is up with that???)... they have inadequate water to do their process... they do not have the money to build their operation at $450 million....Bruce Swingle needs to resign... if the reopening was truly feasible, Freeport would have done it years ago and even before Alta Gold came in and screwed local investors with their similar scam...
If THEMAC could actually do this proposed reopening, they would not have to spend all this time, 14 years, trying to kiss the asses of all the failed, "In Control", "Leaders" of Sierra County who have kept our community from growing... too many lost opportunities while pursuing these P-I-T-S schemes for the past 20 years... Kick them out and keep them out of the City Manager's office... Oh wait...nobody is in that office is there???!!! Kick them out of the County Manager's office, too!!! Share this with as many people as you can... those of you honest enough to!!! Dona Ana County doesn't like the idea of putting the equivalent of a 35,000 resident town at Caballo dam, sucking up their water!!!
ps. Chuck, I am so disappointed in you... still!!! Mike, congratulations on stopping that stupid move on the Armory... the City should move that decrepit warehouse down across from Ralph Edwards Park up to there and build a nice set of restrooms there in its place, with a parking lot to improve the park... time to do some smart things, people!!!

Baca, John, NMENV

From: driftingsand@aol.com
Sent: Saturday, September 08, 2018 8:42 PM
To: Baca, John, NMENV
Subject: Copper Flats

I am a property owner in Truth or Consequences, Sierra County NM and I strongly support opening the mine for much needed jobs and economic vitality for the area.

Sincerely,
Sandra L White

Sent from my T-Mobile 4G LTE device

Baca, John, NMENV

From: Max Yeh <maxyeh@windstream.net>
Sent: Monday, September 17, 2018 11:41 AM
To: Baca, John, NMENV
Cc: Reid, Brad, NMENV
Subject: Hearing on Discharge Permit 1840
Attachments: BEFORE THE NEW MEXICO SECRETARY OF ENVIRONMENT.pdf

Dear Mr. Baca,

Being unable to attend the hearings on Discharge Permit 1840 on the week of September 24th in Truth or Consequences, I am hereby submitting by attachment my comment to be entered into the record of the hearing.

Thank you.

Max Yeh

2018 Comments / Concerns

To: Hearing Clerk, John Baca.
I request that my written comments be added to the record of the Public Hearing.

Secretary of Environment: On the Hearing before the Secretary of Environment
New Mexico Environmental Department

Written Comments Handed in, 25 September 2018, at Public Hearing held in Truth or Consequences, NM

RE: New Mexico Environmental Department
Discharge Permit 1840 – Copper Flat Mine Wastewater Discharge Permit
Docket No. 8WB-18-06(P)

Copper Flat Mine, NM Wastewater Discharge Permit Application
submitted by New Mexico Copper Corp to NM Environmental Dept.
Copper Flat, Located near Hillsboro, Sierra County, NM.

RE: HDPE GEOMEMBRANE Liner for the Tailings Storage Facility (TSF) & any other uses of similar liners for Waste Rock Storage or Water Holding Pond storage, etc.
And other Concerns.

From: Candace Browne
candilight4u@gmail.com
P.O. Box 3642
Truth or Consequences
New Mexico 87901

I oppose granting this permit.
Reasons are listed below.
Thank you for hearing the concerns and questions of the public at this Public Healing.

My Comments/Concerns about any HDPE geomembrane liner system are based, in part, on the **NMCC Mining Plan of Operation,**
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

Printed Material handed in along with my Comments:
Along with my following written Comments / Concerns, I have included **printed** research material:

Geotechnical Construction Quality Assurance (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates (BAS) 16885 West Bernardo Drive, Suite 305 San Diego, CA 92127 ; Prepared by: GeoLogic Associates, same address, San Diego, CA, May 2003 (75 pages)

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants (69 pages)

Layfield Environmental Containment; www.layfieldgroup.com

Source documents not printed include:

THEMAC Resources, New Mexico Copper Corporation, Copper Flat Mine Plan of Operations Report
prepared for U.S. Department of the Interior Bureau of Land Management Lac Cruces District Office , December 2010, Revised June 2011.
NMCC_PoO_191000_03_20111120_FNL.doc.
electronic copy, 358 pages

*United States Environmental Protection Agency Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles

NEW MEXICO COPPER RULE
TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES
20.6.7.1 ISSUING AGENCY: Water Quality Control Commission.
[20.6.7.1 NMAC - N, 12/1/13]
20.6.7.2 SCOPE: All persons

Below are my Comments and Concerns:

COMMENT:
I believe the report listed below is flawed in its estimation of probable leakage from the HDPE liner:
PROBABLE HYDROLOGIC CONSEQUENCES OF THE COPPER FLAT PROJECT SIERRA COUNTY NEW MEXICO, Dec 2017, John Shomaker & Associates, Inc, Water-Resource and Environmental Consultants, prepared by JSAI for THEMAC Resources, New Mexico Copper Corporation

One part of this report is the evaluation of the potential leakage from the HDPE liner that will be under the TSF- tailings storage facility (pond) which will cover up to 600 acres.

Below are some sentences from the SHOMAKER report that seem unsupportable:

'NMCC considers the potential for leaks in the liner to be very unlikely.'

'....the probable hydrologic consequence from a postulated leak in the liner is nil."

3. Potential for groundwater discharge from the tailings storage facility (TSF) and waste rock stockpiles (WRSPs).

TSF and WRSPs

1. Infiltration to groundwater from the tailings and waste rock storage areas is *not expected* due to installation of liner under the TSF and placement of WRSPs on low permeable crystalline bedrock. Any meteoric water that might infiltrate to groundwater is expected to remain in the immediate area for centuries, due to the low permeability of the SFG sediments near the Animas Uplift and due to the presence of flow-inhibiting faults. The impact to groundwater chemistry is expected to be minimal.

3.3.1 Tailings Infiltration
Because the tailings impoundment will be lined, infiltration from the tailings is not expected. However, unexpected sources of potential infiltration include manufacturing defects in the liner and other holes, in the liner and along the seams, developed during placement.

2. NMCC considers the potential for leaks in the liner to be very unlikely. Nonetheless, the potential occurrence of leaks in the tailings facility liner was evaluated based on previous analyses presented in Appendix B.

3. *** page 44: An assumed liner leak occurrence for the purpose of evaluation is one circular defect per acre, with a standard defect area of 1.0cm^2 (corresponding to a round hole diameter of 1.128 cm). The rate of leakage through the defect, assuming a compacted bedding layer beneath the liner and an underdrain system above the liner (Golder, 2016), is given (Appendix B, equation 1) by (a formula) (please see this page for more on this concern)
(end of Shomaker statements)

I did research to see what other professionals have to say about the 'off chance that an HDPE liner will get 'holes' that leak.
How many holes and how much leakage and Why?

Below is the research I found that leads me to believe that the Shomaker report **is flawed in its estimation of probable leakage from the HDPE liner.**

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants, **gives information that is contrary to the SHOMAKER conclusions.** (This document is printed and handed in within my notebook at Public Hearing)

Page 3: No leakage is a great objective, but is not usually realistically achievable.

Page 4 Monitoring and interpreting leakage rates can indicate when a problem has occurred and this can be mitigated before it impacts the environment significantly.

Page 10 How ***NOT*** to estimate leakage rates:
1. Obtain facility information.
2. Undertake *minimal* liner design

3. 3A. Calculate likely range of leakage for minimum liner design from *old literature*, do not consider chemical compatibility, *assume materials, construction, etc will be ideal, etc.*
4. Use the low leakage rates chosen in the RISK ANALYSIS without stating assumptions.
5. Get approval and file it.
6. Do not include assumptions made regarding materials, construction, protection, operation and rehabilitation into subsequent documentation (design, tender, *construction quality plans, operating manuals*, etc)
7. Do not appoint specialists to construct liners
8. *Do not undertake construction quality assurance*
9. *Do not monitor leakage rates nor compare with assumptions used in Risk Analysis*

Page 12:
Mentions leakage rates from Giroud (1989)'
Giroud's formula is what I believe SHOMAKER used.

Page 13*: **Explains mistakes made in the above example***
"The literature you've used is from 1989, and parts have been superseded"
In this section more mistakes are explained.

Page 16:
The proper way to do it is:
You need to use recent literature for liner leakage equations.
(Realize) Not all liners are the same.
The leakage rate range used in Risk Analyses should be calculated by specialists who understand what affects liner performance – head on liners, chemical compatibility, material Specifications, construction specifications, construction quality assurance, operational risks and requirements, rehabilitation risks and requirements, etc.
Assumptions must be carried through to the design, material specifications, construction, operation and rehab phases.
Calculate leakage rates for dams separately.

Page 30:
These formulae (in literature shown below) **do NOT take account of geomembrane *wrinkles.***
Beware-some modeling programmes use these formulae
Giroud, J P and Bonagarte, R (1989) Leakage through Liners Constructed with Geomembranes – Part 1. Geomembrane Liners. Part II Composite Liners Geotextiles and Geomembranes, Vol. 8 No's 1 & 2

Page 31: Rowe and Booker (1998) developed formulae that included transmittivity effects between a geomembrane and underlying clay/GCL, and took the thickness of the clay layer into account, and wrinkles.
Rowe, R.K. and Booker, J.R. (1998) Theoretical solutions for Claculating leakage through Composite Liner Systems. Geotechnical Research Centre Report GEOT-18-98

Page 33: Rowe (2005) again presented calculation of leakage through composite liners, taking linked, linear wrinkles into account.
These calculations provide a much more ***realistic*** range for leakage from composite liners than 1989 calculations.

Page 51: Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles
Addition of sub-section 3(5)
'A competent person must recommend a pollution control barrier system suitable for a ***specific*** residue stockpile or residue deposit on the basis of a Risk Analysis as contemplated in regulations 4 and 7 of the Regulations."
So you can have a non-engineer recommending your pollution control barrier system, sho doesn't know what he/she doesn't know. Same applies for engineers (who) don't understand the complexities of liner performance.
(end of excerpts from this pdf)

There are many more comments in this document that support my concern.
I believe if you study this additional analysis, you will find that the SHOMAKER Conclusions need reassessment and the PERMIT should **not** be based on any CONCLUSIONS using ***outdated*** methods and therefore the PERMIT should not be approved.

This next document 'Geotechnical Construction Quality Assurance Plan" is an excellent example of a precisely detailed CQA showing how it is meant to be set up, carried out, and reported. This is what I believe is necessary for NMCC to show that they are willing to implement for their HDPE liner construction.
Geotechnical Construction Quality Assurance (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates (BAS)
(document printed (75 pages) and handed in within my notebook)

Without this sort of detailed plan for NMED to inspect, I believe the WASTEWATER DISCHARGE PERMIT must be denied.

CONCERN
NMCC Mining Plan of Operation,
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

The **GOLDER** design report, page 1, states *'NMCC has commissioned Golder Associates Inc (Golder) to develop the conceptual design of a new tailings storage facility (TSF) (for the Copper Flat property near Hillsboro in Sierra County, New Mexico).'*

On page 3 **GOLDER** states: *'...the ore reserve has been increased from the 60 million tons identified by Quintana, to approximately 100 million tons.*
Ore will be mined at a rate of 17,500 tons per day (tpd).

'The GOLDER report presents the conceptual design of a tailings storage facility (TSF) capable of supporting tailings disposal for the currently identified ore reserve.'

On page 4 **GOLDER** states: *'Tailings will be delivered at a rate of 17,500 tons per day(tpd) at an anticipated solids content of 50% by weight.*

At 92 per cent availability, the annual tailings deposition rate will be 5.88 million tons.'
[Personal added computation: 5.88 per year x 17 years = 99.96 million tons of tailings sitting on the 514 acre TSF with its 0.80 inch thick HDPE geomembrane liner.]

Questions about Concerns:
Will this Golder TSF design be adequate for the newly Proposed Alternative, Alternative 1 or Alternative 2 now delineated in the November 2015 DEIS?
These new alternatives will speed up to almost twice, the amount of the tailings tpd production daily (from 17,500 to 30,000 tons) as the mining & milling process proceeds 24/7, 365 days a year.

How will this speed up of tons per day (tpd) of tailings material impact the ongoing, *field construction of the liner?*

The new Alternatives change the liquid portion of the tailings to a higher content of water. Will water drain through the tailings more quickly? Will this put additional strain and pressure on the underdrain collection pond ?
How will this extra water affect the supernant pool within the TSF?
What will happen if there is a storm event? Will there be adequate extra storage capacity for the extra water taking into consideration the extra water used to mill the ore using Alternatives 1 & 2?

CONCERN

GOLDER Drawing 6 Notes state: *'Drawings present the conceptual design of a new & expanded tailings storage facility with a capacity of 100 million tons at an assumed dry density of 85 pound per cubic foot.*

GOLDER on page 6: **3.4 TSF Liner System** the Report states: *'The TSF liner will consist of an HDPE geomembrane placed on a minimum 6-inch thick layer of liner bedding fill.*
Beneath the starter dam and embankment underdrain, an 80 mil (0.80 inches) geomembrane is proposed
while within the impoundment interior, the geomembrane thickness will be ***60 mil.***
The underdrain collection pond liner will consist of a lower 60 mil and upper 80 mil HDPE geomembranes
separated by a drain net. '

On page 3 **GOLDER** states options: *'Utilize existing tailings (from Quintana's 3 month 1982 mining venture) as fine grained bedding fill for the future TSF geomembrane liner*
(Or)
Place existing tailings inside the new TSF on top of the new geomembrane liner.'

On page 4 **GOLDER** states: *'The TSF can be constructed in a phased manner.'*

These are **all the details about the HDPE geomembrane liner** given by Golder Associates.

This seems **inadequate** to provide needed detailed information for the NMED to make an informed decision about the WASTEWATER PERMIT. I believe the PERMIT should not be approved.

CONCERN

As stated by one company in the geosynthetics industry, *'It is normal practice to completely track all materials from manufacture to final inspection; qualify technicians and welding equipment each day before welding and every 4 hours after that; and to test each and every seam made in the field.' [Layfield Environmental Containment; www.layfieldgroup.com]*

Within the United States EPA Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles (EPA Guide); *'Section VI discusses **construction quality assurance and quality control'*** Additional references on this will follow.

In the NMCC Mining Plan of Operation & the DEIS there are:
No specifics about exactly which **resin** will be used
nor any detailed information about testing of the geomembrane rolls for defects,
manufacturing requirements,
installation requirements,
qualification of the Company hired to do the manufacturing nor the installation,
no detailed plan for ground preparation
no detailed plan for installation over the gradual increase of the footprint of the TSF over the years the mine is producing tailings.
ETC.

Questions about this Concern:

If Golder Associates does not handle HDPE geomembrane liner manufacture, installation, seaming, CQA, or repairs, then perhaps there is **no information** within the NMCC Mining Plan of Operation giving information on this vital issue. This too seems **inadequate information** to provide the needed detailed information for the NMED to make an informed decision about the WASTEWATER PERMIT. I believe the PERMIT should not be approved.

CONCERN

Since the TSF will be greatly expanded into an area for which no geotechnical or hydrogeological study has been done and because the ground beneath the current TSF (Quintana) is known to be permeable and has been PROVEN to be leaking AMD into the ground water for the past 36 years; I believe the NMED should NOT approve this WASTEWATER DISCHARGE.

Within the Golder Associates report, **the existing problem(s) & potential problem(s) at Copper Flat mine are clearly defined in these sections:**

page 3 : '*During the (Quintana), 1981-82 operating period, high concentrations of* **total dissolved solids and sulfate** *were detected in groundwater immediately downgradient from the existing Quintana (unlined) TSF.*
Local seepage of contaminated groundwater, which has been attributed to the existence of permeable geologic units in the TSF foundation, allowed process water and tailings seepage to migrate from the (TSF) impoundment.'

page 1: *'Permeable foundation materials encountered during site investigation and construction of the (Quintana) TSF have been identified as the potential pathway for seepage from the TSF. Meteoric water leaching of tailings from the Quintana operation potentially contributes additional sulfate and dissolved solids to local groundwater. Management of existing tailings to mitigate existing and ongoing groundwater impacts is considered a parallel objective of TSF design.'*

page 2 - **2.2** *'The existing TSF site was extensively explored by Sargent, Hauskins & Beckwith (SHB) in 1979 and 1980 as part of the SHB design effort.*
No additional field work *was conducted as part of (this- Golder Assoc) conceptual design efforts.'*

'...the (TSF) facility [for NMCC] will be expanded approximately 1,000 feet to the east.'

"Geotechnical investigation (SHB, 1980) of the existing TSF area was extensive, however, a portion of the new TSF will occupy ground that has <u>not</u> (my emphasis) been evaluated for geotechnical and hydrogeological condition. A <u>preliminary site investigation plan</u> (my emphasis) is presented in this (Golder Assoc., Inc) conceptual design report."

<u>CONCERN</u>
A dam breach and flood routing analysis will be required by the State Engineer (10.25.11.12 C (1) NMAC) to verify this classification.'
Has this analysis been completed ? If it has not, then the NMED must not approve this Wastewater Discharge Permit.

page ES-2 & page 5: **3.2 Hazard Classification**:
'Based on the rules and regulations of the NM State Engineer, the Copper Flat TSF would be classified as a large dam having significant hazard potential." According to the New Mexico Administrative Code (19.25.12.10 B NMAC)'
'Dams assigned the significant hazard potential classification are those dams where failure or misoperation result in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.'

Page 5: 3.2 Hazard Classification

'The TSF lies within the Greyback Wash drainage. Inspection of aerial photographs (Google Earth) indicates no human habitations in or adjacent to Greyback Wash between the TSF facility and ***Caballo Lake, into which Greyback Wash ultimately discharges. [Caballo Lake is a reservoir of the Rio Grande River. (My addition)]***
A dam breach and flood routing analysis will be required by the State Engineer (10.25.11.12 C (1) NMAC) to verify this classification.'

COMMENT / CONCERNS
All the above information alerts NMED, other agencies & the Public to the problems at the Copper Flat mine site concerning any future tailings storage facility. It is obvious that any conceptual plans, technical plans and construction quality assurance for a new TSF need to be *scrutinized with great care*.

Wisdom would indicate that to protect the water & all aspects of the environment and for the highest quality all around there needs to be included in the NMCC Mining Plan of Operation & in the WASTEWATER DISCHARGE PERMIT application, a Construction Quality Assurance Plan and a CQC Plan for any HDPE geomembrane liners. This would include a *highly qualified business* that can independently do the necessary testing at each step in the process of any HDPE geomembrane.

Here are a few highlighted points from The EPA Guide
See the document for further details:

Quoting highlights from the Reference:
The *EPA Guide, Chapter 7, Section B,
Designing and Installing Liners:
Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles (see attached):

*EPA Guide page 2: '*If the risk evaluation recommended the use of a single liner, the next step is to determine the type of single liner system most appropriate for the site. Determining which material, or combination of materials, is important for protecting human health and the environment* [1]*. Following this is detail on Clay, geosynthetic clay liners & **geomembrane liners.***

*EPA Guide page 10: B. *'Geomembrane or flexible membrane liners are used to contain or prevent waste constituents and leachate from escaping a waste management unit.'*

Geomembrane or Flexible Membrane Liners

*EPA Guide page 11: What are the thickness recommdations for geomembrane liners?
'Recommended minimum thicknesses ensure that the liner material will withstand the stress of construction and the weight load of the waste, and allow adequate seaming to bind separate geomembrane panels. Reducing the potential for tearing or puncture, through proper construction and quality control, is essential for a geomembrane to perform effectively. '

'What issues should be considered in the design of a geomembrane liner? *...determining appropriate material properties and testing to ensure these properties are met, understanding how the liner will interact with the intended waste stream, accounting for all stresses imposed by the design, and ensuring adequate friction.'*

Material Properties & Selection: *' When designing a geomembrane liner, you should examine several properties of the geomembrane material in addition to thickness, including: tensile behavior, tear resistance, puncture resistance, susceptibility to environmental stress cracks, ultraviolet resistance, and carbon black content. '*
Puncture & tear resistance: *'...subject to tearing during installation due to HIGH WINDS or handling.'*

Susceptibility to *environmental stress cracks*: *'In surface impoundments ...cracks can also result where the geomembrane liner... .. has greater exposure to atmosphere and temperature changes, such exposure can increase the potential for environmental stress cracking.'*

Ultraviolet resistance: *'...especially in cases where the liner might be exposed to ultraviolet radiation for prolonged periods .....which often occur in surface impoundments... ...can cause degradation and cracking. Adding carbon black or other additives....can increase ultraviolet resistance. Backfilling over exposed geomembrane...works to prevent degradation due to ultraviolet radiation.'*

Pages 11-12: Interactions With Waste *'...**chemical resistance** is a critical consideration. Testing for chemical resistance ... American Society for Testing materials (ASTM) has also adopted standards for testing the chemical compatibility of various geosynthetics, including geomembranes, with lechates from waste management units. ASTM D-5747 provides a standard for testing the chemical compatibility of geomembranes.'*

Stresses Imposed by Liner Design: *'...include: the differential settlement in foundation soil,*
strain requirements at the anchor trench,
strain requirements over long, steep side slopes,
stresses resulting from compaction,
and seismic stresses. '

Designing for Adequate Friction: *'Adequate friction between the geomembrane liner and the soil subgrade, as well as between any geosynthetic components, is necessary to prevent extensive slippage or sloughing on the slopes of a unit.'* Several points are explored. *'An evaluation of these issues can affect the choice of geomembrane material, polymer type, fabric reinforcement, thickness, and texture necessary to achieve the design requirements. '*

What issues should be considered in the construction of a geomembrane liner?:
'....appropriate shipment and handling procedures,
perform testing prior to construction,
prepare the subgrade,
consider temperature effects,

and account for wind effects
....select a seaming process,
determine a material for and method of backfilling
AND plan for testing during construction.'

Pages 12-13: Shipment, Handling, and Site Storage *'You should follow quality assurance and quality control procedures to ensure proper handling of geomembranes. ' '...provide for proper storage (on site).'*

Subgrade Preparation: *'..subgrade material should meet specified grading, moisture content, and density requirements.' 'see Chapter 3 of EPA's* Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities (U.S. EPA, 1993c)'

Testing Prior to Construction: *'Before any construction begins, it is recommended that you test both the geomembrane materials from the manufacturer and the installation procedures. Acceptance and conformance testing is used to evaluate the performance of the manufactured geomembranes.*
Constructing test strips can help evaluate how well the intended construction process and quality control procedures will work.' Details are given with ASTM Methods sited.

Page 14: Temperature Effects: *'Liner material properties can be altered by extreme temperatures.*
High temperatures can cause geomembrane liner surfaces to stick together (blocking).
Low temperature can cause the liner to crack when unrolled or unfolded.
Recommended maximum and minimum allowable sheet temperatures for unrolling/unfolding 50°C (122°F) and 0°C (32°F).'

Wind Effects: *'Windy conditions can increase the potential for tearing.....panels can be weighted down with sand bags.'*

Seaming Processes: *'..a critical step involves field-seaming the separate panels or rolls together. For more information,* 'Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams. (U.S. EPA, 1991c).
Consistent quality in fabricating field seams is paramount to liner performance.
Conditions that could affect seaming should be monitored and controlled during installation.
Factors influencing seam construction and performance include:
ambient temperature,
relative humidity,
wind uplift,
changes in geomembrane temperature,
subsurface water content,
type of supporting surface used,
skill of the seaming crew,
quality and consistency of chemical or welding materials,
preparation of liner surfaces to be joined,
moisture at the seam interface,

and cleanliness of the seam interface.'
[No time for a coffee break !]

'To help control some of these factors,
no more than the amount of sheeting that can be used during a shift or a work day should be deployed at one time.
To prevent erosion, ambient temperature increase caused by carbon black, the subgrade should not be wet, etc. '
'Regardless of how well a geomembrane liner is designed, its ability to meet performance standards depends on proper quality assurance and quality control during installation.'

Page 15: Protection and Backfilling: *'For soil covers, three considerations determine the amount of slack to be placed in the underlying geomembrane*
.....appropriate type of soil,
using proper type of equipment,
establishing a placement procedure for the soil.
'... prevent wrinkling ....vehicles do not drive directly on the liner, ...prevent damage caused by covering the liner with too much (page 16)soil too quickly.

'Preventing premature liner failure can be faster and more cost-effective than having to repair a damaged liner.'

Page 16: Testing During Construction:
Testing during construction enables assessment of the integrity of the seams connection the geomembrane panels. ....categorized as either destructive or nondestructive.'
'For increased quality assurance, it is recommended that peel and shear tests on samples from the installed geomembrane be PERFORMED BY AN INDEPENDENT LABORATORY."
See many additional details in the document.
'If test results for the seam or sheet samples do not meet the acceptance criteria for the destructive tests, you should continue testing the area surrounding the rejected sample to determine the limits of the low quality seam....then corrective measures...and retesting.'
Nondestructive Testing is done differently – see the document for details.

Page 23 - IV Double Liners (Primary and Secondary Lined Systems) For details see the report.

Page 24 – V Leachate Collection and Leak Detection Systems For details see the report.

My comment about the above issues highlighted from the EPA Guide is that the November 2015 DEIS, which is one main document I have to work from to know what to research, is woefully incomplete and inadequate without a detailed CQA Plan included in the Wastewater Permit application, so that the EPA considerations will be covered & the CQA Plan can be evaluated by the NMED and all the other Departments involved, plus the public before the PERMIT application goes forward.

CONCERN

In a phone conversation with Brad Reid, NMED, I was told that NMCC is required by New Mexico law to follow the **Copper Rule**

TITLE 20 ENVIRONMENTAL PROTECTION - CHAPTER 6 WATER QUALITY - PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES -
20.6.7.1 ISSUING AGENCY: Water Quality Control Commission.

Mr. Reid told me that the NMCC WASTEWATER DISCHARGE Permit Application does not state within it that NMCC must follow the Copper Rule (it is just assumed).
He said that a statement to that effect does need to be added to the Permit Application.

The Copper Rule does give some guidelines about a CGA and CQC. They seem very generalized, just an outline. They do not give specifics. Doesn't it seem critical to know these details before the WASTEWATER PERMIT decision is made?

CONCERN

WASTE ROCK

If the NMED approves this NMCC Wastewater Permit application for the Copper Flat Mine Project, I am concerned about any **toxic run-off** coming from the **waste rock disposal areas** containing partially oxidized and unoxidized material &/or **low-grade ore stockpiles.**

How will our local summer storm pattern of sudden intense rainfall including:

- how quickly ditches fill and overflow during these storms
- and how powerful the rushing raging water can be
- and how often this onslaught of water breaks through ditches that are man-made.

I am concerned because of how large these disposal areas and stockpile areas will be.
In the MPO, Page 3-6, 3.2.2 Waste Rock Disposal Area and Low-Grade Stockpile, NMCC says "These disposal areas would be expanded under the current MPO to cover approximately **210 acres** (Appendix B).

After the close of the mine the MPO states that there would be approximately 37 million tons of waste rock and 19 tons of low-grade ore.

I am concerned about the quantity of rainwater during a major summer rainstorm landing on this large acreage could carry toxic fluid from the wasterock area and eventually seep into ground water.

I am concerned because an accident of this type could occur AFTER THE MINE RECLAMATION IS FINISHED AND NMCC IS NO LONGER INVOLVED OR LIABLE FOR ANY DAMAGE.

CONCERN
Data Missing from the NMCC Mining Plan of Operation

If the NMED approves this NMCC Wastewater Permit application for the proposed Copper Flat Mine Project, Sierra County, New Mexico, I am concerned about all the places in the Plan of Operation where data is missing.

I am concerned because there are places where instead of data it just says:

- "Pending"

- "will be determined....."
- "will be added as design studies go forward...."
- and other similar statements that are used in place of adequate data, studies, plans, reports, etc concerning the actual Plan of Operation

I am concerned because there is no way to know if what may be added as data, studies, plans, reports, etc concerning the actual Plan of Operation might be a CONCERN and the public has NO WAY to voice it's CONCERNS if it does not have a chance to see this information.

COMMENT- other resource documents
Predicting Water Quality Problems at Hardrock Mines, A Failure of Science, Oversight, and Good Practice by Alan Septoff, EARTHWORKS, 2006

"Summitville Mine". *Region 8 - Superfund*. U.S. Environmental Protection Agency. Archived from the original on 2006-10-10.
http://web.archive.org/web/20061010032331/http://epa.gov/region8/sf/sites/co/sville.html
Retrieved 2007-01-04.

Effects of Surface Mining on Ground Water Quality, Nature of Ground-water pollution by surface mining by Henry Rauch

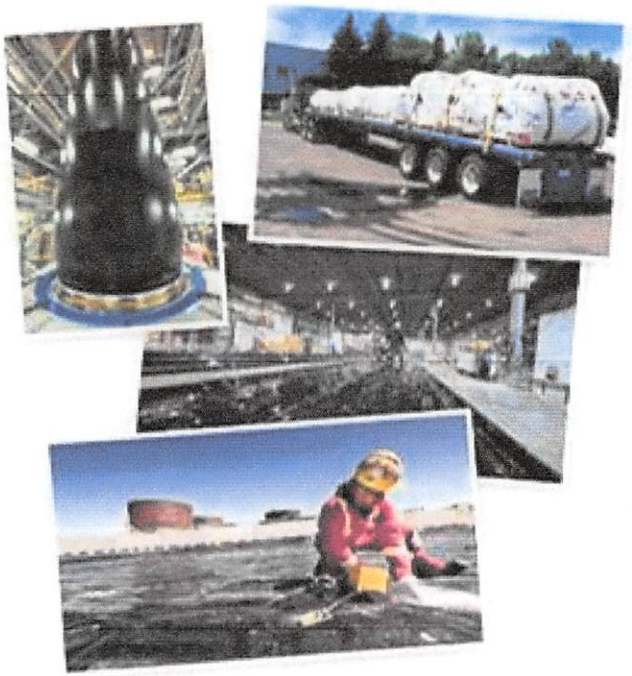
HARDROCK MINING IN NEW MEXICO, 2006
EARTHWORKS 2007, Cathy Carlson and Jonathan Schwartz
www.earthworksactio.org
Abandoned Mines: The counties with the most abandoned mines are Grant, McKinley and **Sierra**. The state does not have dedicated funding for cleaning up *pollution* from abandoned mines. The New Mexico Abandoned Mine Land Bureau gets funding from the federal Surface Mining Control and Reclamation Act to mitigate only physical hazards at abandoned hardrock mines.

Article 22, Section 21 of the Constitution of the State of New Mexico says,
"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare.
The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."

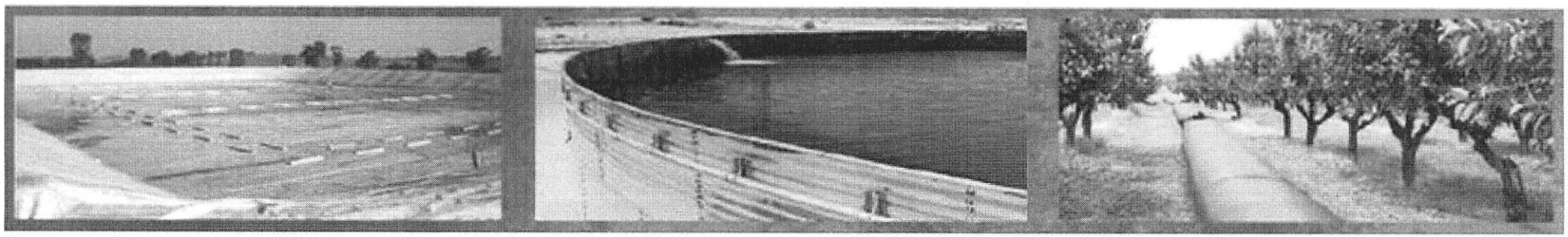
Thank you for hearing the concerns and questions of the public at this Public Healing.

VERTICAL INTEGRATION

Layfield Environmental Containment is a vertically integrated company involved in the manufacturing, fabrication, installation, and maintenance of high performance geomembranes and specialty geosynthetics. We are the only company that provides you single-source accountability through our combined abilities to manufacture, fabricate, install and service.



- Manufacturing – Our geomembrane extrusion facility is located in Vancouver, British Columbia.
- Fabrication – Our fabrication facilities are located in San Diego (California), Edmonton (Canada), and Toronto (Canada). Our state-of-the-art roll-to-roll automated fabrication machine that can weld up to 5 panels wide.
- Installation – We have installation crews across North America. Layfield installs, designs, and services many types of geosynthetics products with a focus on geomembrane and floating covers.
- Inspection and Maintenance - Layfield has a complete service department that specializes in the cleaning, inspection, and repair of geomembranes, floating covers, and other geosynthetic installations.



Layfield is committed to help Californians protect their water and their future. **At Layfield, WE PROTECT.** For more information, contact Layfield at 619.273.5003 - sandiego@layfieldgroup.com.

18843

GEOSYNTHETICS HELPING TO CONSERVE OUR ENVIRONMENT

August 30, 2010

We increasingly read or hear statements about the negative impacts of plastics on our environment. While it's true that plastic bottles littering public spaces certainly don't benefit the earth or its inhabitants, it's important to remember that there are many types of plastic and many ways in which it can be used.

What are geosynthetics?

Geosynthetics (plastics that are used in the earth) are a family of plastic-based products that are helping us conserve resources and protect the environment. These important products include geomembranes (liners) and floating covers. In most cases, geosynthetics are not only the most energy efficient and cost effective way of constructing infrastructure projects, but they simultaneously provide systems which help protect the environment.

What makes geosynthetics a good choice for the environment?

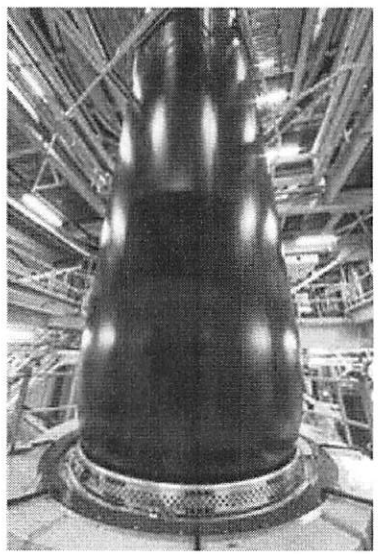
They are less resource intensive

The plastics used in geosynthetics are lightweight, durable, and easy to install requiring considerably less energy to ship and place than alternative construction materials and techniques. Geosynthetics are also resource efficient; plastics account for only 2% of all petroleum use and do not contribute significantly to greenhouse gas emissions. Plastics are also resistant to corrosion and degradation which allows us to use them for permanent applications such as landfill liners and reservoir floating covers.

They safeguard our water

Geomembranes are impervious plastic liners designed to contain a wide variety of liquids including water, waste water and various chemicals. Geomembranes are normally used for water containment and waste water treatment ponds. Each year Layfield helps safeguard precious drinking water by carefully lining and/or covering ponds and reservoirs with drinking water rated geomembranes.. Lining a reservoir with a plastic geomembrane is much less energy intensive and far more effective than lining a reservoir with clay, concrete, or asphalt. And, where other liner types can contribute contaminants to the water, plastic reservoir liners maintain the purity of the water. Our floating covers protect drinking water from evaporation and contamination. Lined ponds with floating covers are much more cost effective methods of storage than tanks or structural reservoirs and are gaining in popularity around the world.

MANUFACTURING



Layfield Environmental Containment is a leading North American manufacturer of flexible geomembrane liners. The manufacture of geomembranes at Layfield is governed and controlled by our registered quality management system which meets the requirements of the ISO 9001:2008 standard. Each product is certified to meet published Minimum Average Roll Value (MARV) specifications which can be found on this website. Layfield can provide signed mill certificates for each lot of geomembrane produced, showing actual results for specified properties.

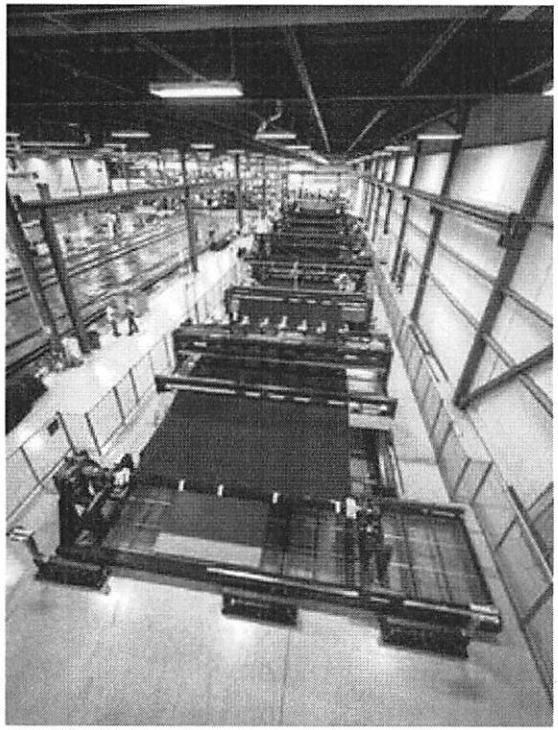
Layfield is the leading manufacturer of fortified geomembranes. The process of fortifying a geomembrane requires that a geomembrane be manufactured with special prime grade resins blended with advanced additives that provide superior physical, mechanical and endurance properties. The advantages of a fortified geomembrane include superior chemical resistance and long-term performance properties. Our Research and Technology Group constantly researches and develops innovative ways to enhance the quality of our existing products, and develop new and more specialized products.

Layfield manufactures some of the industry's most popular brands of geomembranes including our Enviro Liner® and HAZGARD® geomembranes. Layfield also manufactures a variety of standard grade polyethylene geomembranes. Layfield is able to produce a variety of wide geomembrane widths and thicknesses designed both for prefabricated liners and field installed liners. Our co-extrusion process provides texturing capabilities and a variety of specialty skin colors.

LAYFIELD UNVEILS THE GEOFAB 5X

November 25, 2014

Layfield announced today the commissioning of the *GeoFab 5X; the* world's largest combined geotextile sewing and geomembrane welding production line. With this line Layfield has significantly scaled up its plant conversion capabilities to tackle the world's largest and most demanding projects. Brian Fraser, Vice President of Layfield Environmental Containment says, "The *GeoFab 5X* is a game changer in terms of scale. It can join master rolls of geosynthetic material at high-speeds up to 26 metres (85') wide and can make any length roll our customers can handle. There's nothing like this line anywhere else in the world!" *GeoFab 5X* is designed to both sew high strength geotextiles as well as thermally weld geomembranes.



Layfield recently completed an extremely large project that required over 37,700,000 ft^2 (3,500,000 m^2) of high strength geotextile fabric with 373 miles (600 km) of sewn seams that had a rigorous specification requirement of 470 pounds per inch (82 kN/m) of tensile strength. In addition, the geotextile portion was on the critical path of the project's schedule and had a very tight construction timeline for completion. As the industry leader in providing innovative solutions with geosynthetics, Layfield commissioned the design and construction of the world's most efficient geosynthetic fabrication line, with state-of-the-art seam integrity technology.

High strength geotextiles are used to reinforce and stabilize weak soils when working in poor subgrade conditions. Applications include building access roads, lease pads, reinforced slopes, tailings dam reinforcement, and capping sludge and tailings ponds as part of their final restoration and closure phase. *The GeoFab 5X* line will also weld large prefabricated geomembrane panels (impervious liners) used to provide environmental containment. Applications for geomembranes include the lining of tailings ponds, waste water lagoons, landfills, irrigation canals, and water and waste water treatment ponds.

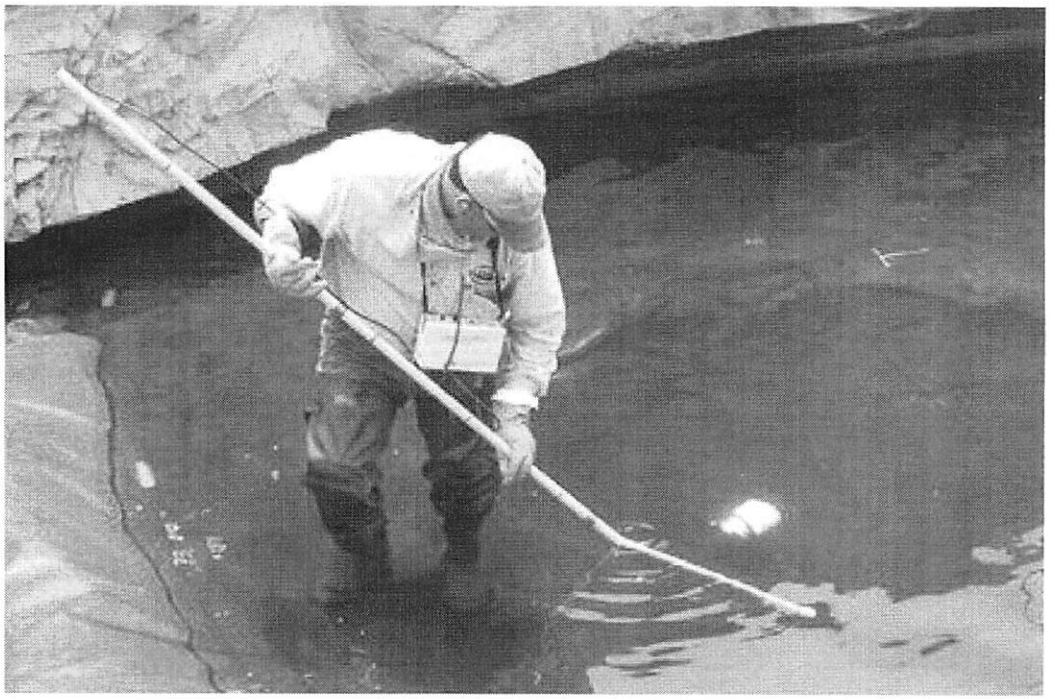
ICATION

s one of the leading geomembrane and
: fabricators in North America. Our
n facilities are located in San Diego
a), Edmonton (Canada), and Toronto
Our state-of-the-art, roll-to-roll automated
n machine can weld up to five
orane panels wide. Prefabrication, also
: factory fabrication, refers to the process of
or welding geomembranes or geotextiles
panels that are folded and transported to
ct site. Factory fabrication is done under
ditions in our fabrication plants; there is no
out extreme temperatures, moisture, or duct interfering with the production of a sound seam. Facto
n also reduces or eliminates field seaming, speeding up installation and significantly reducing cos
broadest and most complete range of prefabricated geomembranes in the market. For more infor
ation capabilities, please contact Layfield.

CONSTRUCTION SERVICES

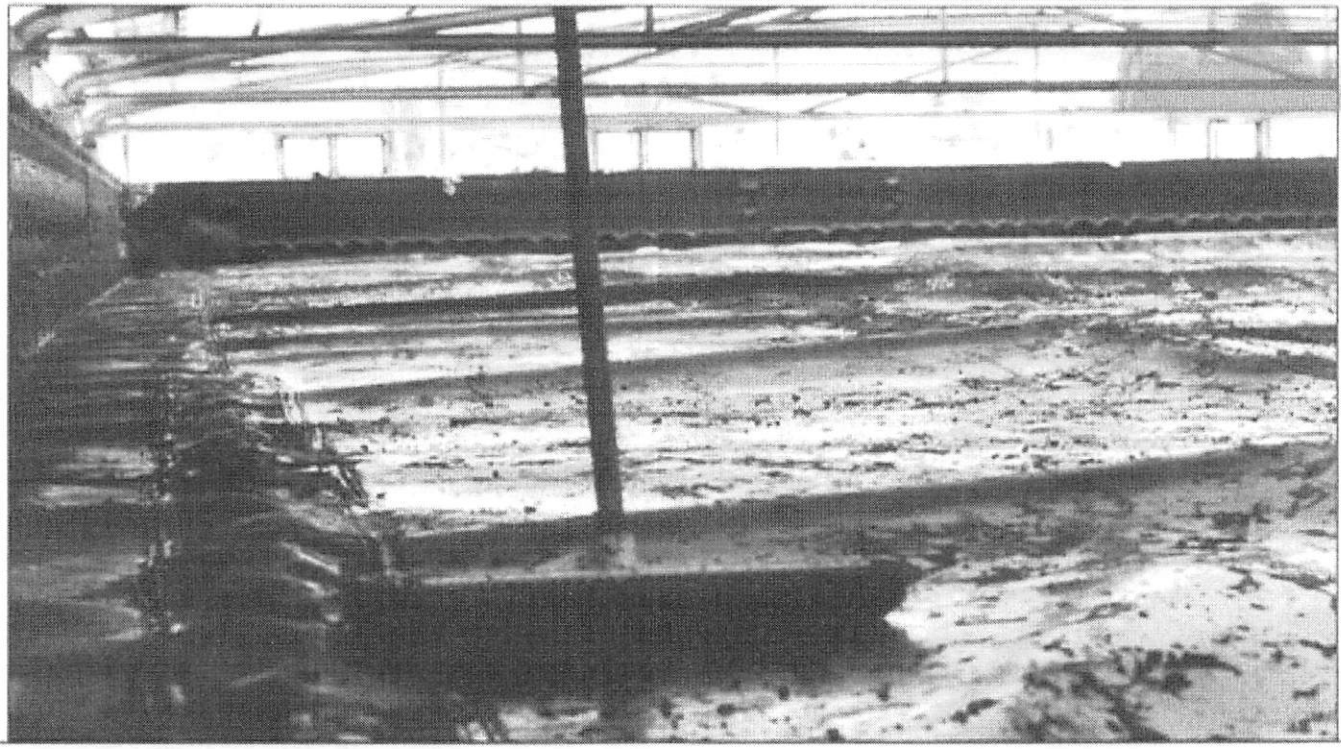
Layfield is a specialized contractor providing construction services across North America, with a focus on geomembrane and floating covers. Layfield has achieved Approved Installation Contractor status through the International Association of Geosynthetics Installers. We place, weld, and test millions of square meters of material each year. Our installation crews are trained in quality control, safety, and project management so that every new Layfield geosynthetic installation is as reliable as the last. From the smallest secondary containment system, to the largest floating covers, Layfield's installation crews are ready to tackle your critical environmental protection project.

MAINTENANCE SERVICES



Layfield has a complete service department that specializes in the cleaning, inspection, and repair of geomembranes, floating covers, and other geosynthetic installations. Layfield can provide contract maintenance services as part of your environmental monitoring plan. Geomembranes are often relied upon to provide the majority of environmental protection at a facility; however they usually receive little maintenance. Layfield's technicians can locate defects in the geomembrane and restore your environmental protection. Contact Layfield for additional information on our maintenance packages and services.

SOLVENT CONTAINMENT TANKS copper and uranium mines



Description

Three copper and uranium mines needed to replace costly stainless steel tanks with concrete tanks lined with high density polyethylene (HDPE geomembrane). The tanks were tested before filling and a number of leaks were found. The holes were repaired and the tanks were again filled; more leaks were found and repaired. They were filled with process solution - leaks were found and repaired. This process was continued until leaks were occurring faster than they could be fixed. Because leaks occurred in and along the edges of welds, the liner installer was blamed for making faulty welds. The culprit, however, was improper material selection. The organic components contained in the tanks were unsuitable for containment by HDPE. To date, the failure of the liners at one of the mines has resulted in a lawsuit for $23 M. The figure is still climbing...

Cause

Material selection. The design engineer insisted that HDPE liners had been used satisfactorily in similar installations - they had not. In fact, the organic components contained in these tanks were listed in typical chemical resistance charts as being unsuitable for containment by HDPE. During the design phase, the HDPE manufacturer recommended that simple chemical resistance tests be performed at a cost of about $10,000. The engineer did not see the need to spend $10,000 and declined to do the tests.

APPENDIX N

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE LINER SYSTEM

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE COMPOSITE LINER SYSTEM AT GREGORY CANYON LANDFILL

Prepared for:

Bryan A. Stirrat & Associates
16885 West Bernardo Drive, Suite 305
San Diego, California 92127

Prepared by:

GeoLogic Associates
16885 West Bernardo Drive, Suite 305
San Diego, California 92127

May 2003
Revision 1: November 2003
Revision 2: April 2004
9539-65

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE COMPOSITE LINER SYSTEM AT GREGORY CANYON LANDFILL

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1.0 INTRODUCTION

A Construction Quality Assurance (CQA) program consists of selected testing, inspection and documentation of a final construction product in order to provide the Owner/Agencies an evaluation of whether the end product is of the specified quality of materials and workmanship. Because of possible conflicts of interest, the Contractor should not undertake the CQA function directly. Rather, CQA inspection and testing should be left under the objective authority of a single team of inspection professionals.

A Construction Quality Control (CQC) program consists of selected tests and inspections performed by the Contractor during production which can assist the Contractor in producing the quality product required. While the CQC function is the sole responsibility of the Contractor, the Project Manager may, at his/her discretion, provide information regarding the ongoing CQA monitoring for the Contractor's use in implementing his/her CQC function. Release of the CQA data to the Contractor is for convenience only and, in no way, relieves the Contractor from their responsibility to fulfill the project requirements.

The composite liner system proposed for the GCLF consists of individual discrete layers of earth and synthetic materials which will function as a unit to form the containment system for the waste management area. A geocomposite drainage layer and additional layers of GCL and geomembrane will also be installed on benches and under the LCRS mainline as shown on the Project Drawings.

Each of these components functions as an integral part of the composite liner system and consequently must become a finished product during the course of construction. As a result, it is important that each layer or component of the composite liner be completed to the design specifications prior to construction of successive or overlying layers. For this reason, it is both inefficient and impractical to withhold CQA testing until completion of the liner and it is necessary to conduct an ongoing CQA program during construction.

This document presents the geotechnical Construction Quality Assurance (CQA) Plan for installation of the earthwork and geosynthetic components of the composite liner system for the Gregory Canyon Landfill (GCLF) in San Diego County, California. This CQA Plan is to be used in conjunction with the Preliminary Engineering Design and Phased Development Plans (September 2001) and Specifications prepared for the GCLF.

This plan includes:

- A Quality Assurance Program to be implemented during earthwork and geosynthetic material construction; including field observation, laboratory and field testing, and acceptance criteria for constructed work;

- Recording and documentation procedures to be employed for demonstrating that the constructed earthwork and geosynthetic liner components meet the requirements of the Project Plans and Specifications;

- Lines of communication, responsibilities and roles of the Construction Quality Assurance team and other related Project Personnel.

1.1 PROJECT REQUIREMENTS

In order to satisfy the requirements established by the governing regulatory agencies, the following composite liner system design has been proposed for the GCLF.

In floor areas (gradient less than 5:1 horizontal:vertical), the composite liner system designs will be composed of the following elements:

- Subgrade prepared to the requirements of the Project Documents;
- A one-foot thick subdrain gravel layer composed of select drainage gravel materials;
- A twelve (12)-ounce per square yard non-woven geotextile fabric;
- A minimum two (2) foot thick compacted soil liner yielding a permeability of less than 1.0×10^{-7} cm/sec;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A nine-inch minimum thickness gravel or equivalent drainage layer;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A geosynthetic clay liner (GCL);
- An 80-mil thick double-sided textured HDPE geomembrane;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A one (1) foot thick leachate collection layer composed of select drainage gravel materials;
- A twelve (12) ounce per square yard non-woven geotextile fabric;
- A two (2) foot thick protective cover soil layer (operations layer) composed of select on-site soil materials. Said materials shall be screened to exclude particles in excess of one-inch in maximum dimension.

In slope areas (gradient steeper than 5:1 horizontal:vertical) the liner system will be composed of the following elements:

- Subgrade prepared to the requirements of the Project Documents;
- A minimum two (2) foot thick compacted soil liner yielding a permeability of less than 1.0×10^{-7} cm/sec;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A geosynthetic clay liner (GCL);
- An 80-mil thick single-sided textured HDPE geomembrane (textured side placed down);
- A sixteen (16) ounce per square yard non-woven geotextile placed immediately on top of the geomembrane;
- A minimum two (2) foot thick protective soil cover (operations layer) composed of select on-site soil materials. Said materials shall be screened to exclude particles in excess of one-inch in maximum dimension.

All materials used to construct the composite liner system must meet or exceed the criteria established in this CQA document and the Project Plans and Specifications. Any deviation from these criteria must be pre-approved by the Engineer and the Geotechnical CQA Consultant.

2.0 RESPONSIBLE PARTIES AND DEFINITIONS

2.1 RESPONSIBLE PARTIES

The responsible parties for all composite liner system construction activities at the GCLF, as set forth herein, are as follows:

Owner:
Gregory Canyon Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111
Phone: (415) 391-2833
Contact: General Manager, Dr. Jerry Riessen

Landfill Operator:
Gregory Canyon Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111
Phone: (415) 391-2833
Contact: General Manager, Dr. Jerry Riessen

Landfill Engineer:

Bryan A. Stirrat & Associates
1360 Valley Vista Drive
Diamond Bar, California 91765
Phone: (909) 860-7777
Contact: Mr. Mike Cullinane

Construction Manager:

To Be Determined

Geotechnical CQA Consultant:

To Be Determined

2.2 DEFINITIONS

"Construction Manager" - Person(s) or firm(s) authorized by the Owner to manage and oversee the administration of the Construction Contract. The Construction Manager shall be responsible for evaluating lines and grades (survey control) for the individual liner elements as well as verification of payment request, submittal acceptance, and change orders.

"Contractor" - The firm responsible for all elements of construction of the containment system. In this regard, the Contractor's responsibilities includes but are not limited to: preparation of subgrade and supporting surfaces (generally soil) for the geosynthetic installation; installation of the HDPE and geosynthetics; and placing earth and granular materials over the installed synthetic systems. The Contractor is further responsible for all activities of Subcontractors including but not limited to the geosynthetics Subcontractor.

"Geosynthetics" - A generic classification given to synthetic (man-made plastic and fabric) materials used in geotechnical and construction applications. Included are geomembrane or flexible membrane liners (i.e., HDPEs), geotextiles, geosynthetic clay liner (GCL), geonets, geogrids, geocomposites and geocells. At the GCLF, the term geosynthetics is used to refer to the HDPE, GCL, geocomposites and geotextiles.

"Geosynthetic Subcontractor" - The firm responsible for handling, storing, placing, seaming, and other aspects of the installation of the geosynthetics included in the composite liner system.

"Geotechnical CQA Officer" - The individual or firm serving under the direction of the Geotechnical Project Director and responsible for day to day geotechnical Construction Quality Assurance (CQA).

"Geotechnical CQA Monitors" - The individuals working under the direction of the Geotechnical CQA Officer who are routinely involved in the construction process. Such personnel include "Technicians", "Field Engineers" and "Field Geologists" representing the Geotechnical Consultant. CQA Monitors responsible for the geosynthetics and earthwork, shall be experienced in landfill construction monitoring, geosynthetic material installation, low-permeability soil construction and testing, and compaction testing during grading operations.

"Geotechnical Consultant" - Geotechnical firm responsible for the design and specifications for the earthwork and geosynthetic elements of the Project Plans and Specifications. The Geotechnical Consultant or his/her representative is also responsible for observing, testing, and documenting activities related to quality assurance for all geotechnical and geosynthetic aspects of construction except for engineering and survey control. All completed geotechnical work is subject to approval by the Geotechnical Consultant.

"Geotechnical Project Director" - Geological/geotechnical professional registered in the State of California who, under the employ of the Geotechnical Consultant is responsible for earthwork observation, monitoring and testing.

"Geotechnical Construction Quality Assurance for Earthwork" - The protocols to be followed in evaluating the adequacy of the Contractor's work with regard to all elements of earthworks construction with the exception of line and grade (survey) control. Said work shall include but need not be limited to all CQA activities delineated herein and in the Specifications. Geotechnical CQA is to be provided by a party independent of the Contractor.

"Geotextile" - A permeable synthetic fabric used with soil, rock, sand, gravel or any other similar materials as an integral part of the composite liner system. It can provide protection to other systems or serve to separate different materials.

"Independent Testing Laboratory" - The firm responsible for conducting selected tests of materials and/or products used for the project, such as conformance testing. The laboratory shall be independent of the Manufacturer, Contractor, Geosynthetics Subcontractor and any party involved with the manufacture and/or installation of any product to be tested.

"Landfill Engineer" - The firm responsible for the design and preparation of the Project Plans and Specifications including the containment system that fulfills the regulatory and operational requirements of the permitting agencies and Owner,

respectively. The Landfill Engineer, also known as the Engineer, is also responsible to modify or change the design if unexpected or unanticipated site conditions are encountered during construction.

"Project Documents" - Project Documents include all Construction Drawings, Record Drawings, Construction Specifications, CQA Plans, Health and Safety Plans and Project Schedules and Contractor Submittals.

"Project Manager" - The Owner's designated representative responsible for the Project.

"Project Drawings and Specifications" - All project related Drawings and Specifications including Design Modifications and Record Drawings.

"Quality Assurance" - Actions taken by the Owner or his representative necessary to evaluate whether the earthen and geosynthetic materials and workmanship meet the requirements of the Project Plans and Specifications.

"Quality Control" - Actions taken by the Contractor, Subcontractors and/or Liner Manufacturer(s) to ensure that the earthen and geosynthetic materials and workmanship meet the requirements of the Project Plans and Specifications.

"Work" - All tools, equipment, supervision, labor, and materials or supplies necessary to complete the project as specified herein and as shown on the Project Drawings.

3.0 GEOTECHNICAL CQA ORGANIZATION

The Geotechnical CQA Team for composite liner system construction will be composed of design and field personnel with specific experience in the inspection and Geotechnical CQA monitoring of earthwork, low-permeability liner soils and geosynthetic materials specifically related to landfill liner construction. The principal categories of personnel assigned to the Geotechnical CQA Team are presented below.

3.1 GEOTECHNICAL PROJECT DIRECTOR

The Geotechnical Project Director shall be a representative of the Geotechnical CQA Consultant and shall have overall responsibility for all geotechnical CQA activities and have specific experience in managing landfill liner construction projects.

The Geotechnical Project Director will be responsible for reviewing all earthwork or geosynthetic issues which may arise during construction. The Geotechnical Project Director's approval will be required for any earth or geosynthetic material modifications or for any design modifications which may impact the performance of the earth or geosynthetic materials.

3.2 GEOTECHNICAL CQA OFFICER

The Geotechnical CQA Officer will serve as the Geotechnical Project Director's on-site representative. All Geotechnical CQA functions will be his/her direct responsibility. All coordination, reporting and issues related to earthwork and/or geosynthetics non-compliance will be directed through the CQA Officer. In addition, he/she will participate with the Landfill Engineer and Geotechnical Project Director in all decisions related to design issues which arise during the course of construction.

The Geotechnical CQA Officer shall be responsible for overall review, observation, sampling, and testing of activities utilized for Construction Quality Assurance (CQA). The Geotechnical CQA Officer shall have prior experience serving as the CQA Officer on similar liner construction projects. Specific duties of the CQA Officer include:

- Review of all designs, Project Plans, and Specifications;
- Implementation of the Geotechnical CQA program including: assignment and management of all Geotechnical CQA personnel; review of all field reports; and review of all Geotechnical CQA related issues;
- Review of design changes and coordination of such changes with the Engineer;
- Serving as the on-site representative of the Geotechnical Project Director;
- Familiarization of all Geotechnical CQA Monitors with the site and the Geotechnical CQA requirements of the project;
- Attendance at Geotechnical CQA related meetings (i.e., preconstruction, progress, and special meetings as required);
- Review of all Liner Manufacturer and Liner Subcontractor certifications and documentation and development of appropriate recommendations;
- Designation of a senior Geotechnical CQA Monitor to act on his/her behalf at the site while he/she is absent and operations are ongoing;
- Notation of any on-site activities that could result in damage to the geosynthetics;

- Review of the Liner Subcontractor's personnel qualifications for conformance with project requirements;
- Selection of locations for destructive test sampling;
- Oversight of the ongoing preparation of "As-Built" Plan(s);
- Review of all Geotechnical CQA Monitors daily reports and logs;
- Reporting to the Construction Manager and logging in his/her daily report any relevant observations reported to him by the Geotechnical CQA Monitors;
- Oversight of the marking, packaging and shipping of all laboratory test samples;
- Review of the results of laboratory testing and presentation of appropriate recommendations;
- Preparation of a monthly summary of Geotechnical CQA activities;
- Reporting of any unresolved deviations from the Geotechnical CQA Plan to the Construction Manager;
- Preparation of the final "As-Built" report for all completed geosynthetic construction activities;

3.3 GEOTECHNICAL CQA MONITORS

3.3.1 FIELD ENGINEER/FIELD GEOLOGIST

The Field Engineer/Field Geologist will be a representative of the Geotechnical CQA Consultant and will be responsible for evaluating whether earth and/or synthetic materials conform to the requirements of the Project Drawings and Specifications. The Field Engineer/Field Geologist will have specific experience in landfill construction monitoring, compaction observation and testing during grading operations, and geosynthetic material observation, monitoring and documentation. Duties of the Field Engineer/Field Geologist will include the following:

- Subgrade inspection, review, testing and documentation.
- Review of the adequacy of all clearing, grubbing, stripping and preparation of areas to receive fill.
- Monitoring and evaluation of any soil blending, mixing and processing operations.

- Evaluation of the engineering characteristics of the processed and constructed earth materials.

- Observation and evaluation of all cuts which may be impacted by geologic conditions.

3.3.2 GEOTECHNICAL CQA TECHNICIANS

Geotechnical CQA Technicians will be representatives of the Geotechnical CQA Consultant and will continuously observe all grading and geosynthetic operations to provide a basis for concluding that construction is carried out in conformance with the Project Drawings and Specifications. The duties of the Geotechnical CQA Technicians include monitoring, observing and testing all earthwork as well as monitoring, logging and documenting all geosynthetic installation operations.

The operations to be monitored observed and/or tested for the earthwork include:

- Observation of subgrade surface preparation.

- Verification that liner soils are derived from appropriate sources.

- Visual evaluation of the soil physical properties for consistency with the Project Drawings and Specifications.

- Evaluation of all moisture conditioning and processing operations to evaluate uniformity of material and moisture content.

- Evaluation of the constructed low-permeability liner material for conformance with the Project Drawings and Specifications.

- Identification of deleterious materials or other deficiencies in soil characteristics to minimize the possibility that these materials are incorporated into the composite liner system.

- Monitoring of activities for the removal and/or disaggregation of oversize material.

- Observation of uniformity of coverage of compaction equipment, especially at fill edges, turnaround areas and on slope faces.

- Monitoring of lift thickness.

- Observation of the active fill pad at the beginning of each grading day and establishment of requirements for wetting/drying and/or processing of exposed surfaces prior to placement of additional fill.

- Undertaking field tests including but not limited to BAT permeability and field moisture/density testing at the minimum frequencies noted herein or at any time that a deficiency is suspected.

- Recovery of samples for laboratory testing.

- Completion, evaluation and/or documentation of laboratory testing of the permeability, grain size distribution, Atterberg Limits, in-place moisture content and density of the low-permeability layer materials in accordance with the requirements of the Specifications (including retests, if necessary).

- Confirmation that the test results are in accordance with the Project Specifications (including retests of any previously failed areas).

The operations to be observed and monitored for all geosynthetics include:

- Material delivery.
- Unloading and on-site transport and storage.
- Placement/deployment operations.
- Joining and/or seaming operations.
- Repair operations.

Specifically, the seaming operations to be monitored include:

- The condition of panels as placed.
- Trial seams.
- Seam preparation.
- Seaming.
- Nondestructive seam testing.
- Sampling for destructive seam testing.
- Laboratory test sample marking.
- Repair operations.
- Reviewing the final certification of seams.

All observations shall be reported in a timely manner to the CQA Officer and the Construction Manager.

3.4 INDEPENDENT TESTING LABORATORY

The Independent Testing Laboratory shall be certified by the Geosynthetic Accreditation Institute (GAI) in the specific tests to be performed and will perform all conformance testing of geosynthetics and all destructive laboratory testing of field seams.

4.0 MEETINGS

In order to facilitate construction of the composite liner system, close coordination between the Construction Manager, Engineer, Geotechnical CQA Consultant, Contractor, Liner Subcontractor and Geotechnical CQA personnel is essential. To this end the following meetings will be scheduled.

4.1 PRE-CONSTRUCTION MEETINGS

A Pre-construction Meeting will be held at the site. At a minimum, the meeting shall be attended by the Owner (or designated representative), the Construction Manager, the Landfill Engineer, the Geotechnical Consultant (or designated representative), the Contractor and appropriate Geotechnical CQA staff. Specific items to be considered at this meeting will include:

- Any appropriate modifications to the Geotechnical CQA requirements.
- Development of a format for site specific documentation.
- Review of the responsibilities of each party.
- Review of the lines of authority and communication.
- Review of work area security and safety protocol.
- Review of the procedures for project documentation and reporting, and distribution of documents and reports.
- Review of procedures for submittals, change orders and extra work efforts.
- Review of the Contractor's proposed methods of construction, (including equipment), with specific emphasis on methods of select grading, soil mixing, stockpiling, processing, moisture conditioning and compaction.
- Review of the procedures for field and laboratory CQA testing.
- Establishment of procedures for correcting and documenting construction deficiencies.
- Conducting an initial site inspection to discuss work areas, stockpile areas, mixing tables, laydown areas, access roads, haul roads, and related items.
- Review of the project schedule.

The meeting shall be documented by the Construction Manager and minutes shall be distributed to all parties.

4.2 WEEKLY PROGRESS MEETINGS

Progress Meetings shall be held weekly. At a minimum, these meetings shall be attended by the Owner (or designated representative), the Construction Manager, the Geotechnical CQA Officer and/or the Geotechnical CQA Monitors, and the Contractor. Weekly progress meetings shall be documented by the Construction Manager or his/her representative and minutes shall be distributed to all parties. The purpose of these meetings is to:

- Discuss any health and safety related issues.
- Review scheduled work activities.
- Discuss project related problems.
- Review laboratory and field test data.
- Discuss the Contractor's personnel and equipment assignments.
- Review the previous week's activities and accomplishments.

4.3 SPECIAL MEETINGS

Special meetings will be conducted as required to discuss any problems or deficiencies. At a minimum, these meetings will be attended by the Owner (or designated representative), Construction Manager, appropriate Geotechnical CQA staff and the Contractor. If correction of a problem requires a design modification, the Landfill Engineer and the Geotechnical Project Director will also be present. The purpose of these meetings is to:

- Define and discuss any problems or deficiencies in the Project.
- Review possible corrective actions or solutions.
- Implement an action plan to resolve the problems or deficiencies.

Special meetings shall be documented by the Construction Manager or his/her representative and minutes shall be distributed to all parties.

4.4 GEOSYNTHETIC MATERIAL PRE-INSTALLATION MEETING

A Geosynthetic Material Pre-installation Meeting shall be held at the site before installation of the geosynthetics. At a minimum, the meeting shall be attended by the Construction Manager, the Engineer, the Contractor, the Liner Subcontractor, and Geotechnical CQA staff. The Pre-Installation Meeting will not be conducted until all Manufacturer Certifications required by the Project Specifications and this document are received, reviewed and approved.

Specific items to be addressed at this meeting include:

- Submittal and review of relevant documents.
- Definition of appropriate modifications to the Geosynthetic Geotechnical CQA requirements.
- Development of a format for site specific documentation.
- Definition of the responsibilities of each party.
- Definition of lines of authority and communication.
- Review of work area security and safety protocol.
- Definition of methods for documenting and reporting, including distributions.
- Selection of welding equipment and procedures.
- A field welded seam(s) demonstration.
- Identification of testing equipment and procedures, including peel and shear tests, and procedures for communicating laboratory test results.
- Identification of procedures for correcting and documenting construction deficiencies.
- A site inspection to discuss storage areas, work areas, storage areas and protocols, laydown areas, access roads, haul roads, and related items.
- Review of the project schedule.

The meeting shall be documented by the Construction Manager and minutes shall be distributed to all parties.

4.5 DAILY PROGRESS MEETINGS (if necessary)

Daily Progress Meeting shall be held in the field before the start of work each day. At a minimum, this meeting shall be attended by the Geotechnical CQA Officer or his/her representative, Geotechnical CQA Monitors, the Contractor and the Liner Subcontractor. The purpose of this meeting is to:

- Review and coordinate scheduled work activities between the Geotechnical CQA monitors and the Liner Subcontractor's crew.
- Discuss any problems.
- Review test data.

- Discuss the Liner Subcontractor's personnel and equipment assignments for the day.

- Review the previous day's activities, accomplishments and/or deficiencies.

4.6 MANUFACTURING PLANT VISIT(S)

The Liner Subcontractor shall make arrangements with the Liner Manufacturer(s) to allow the Geotechnical CQA Officer or his/her designee to visit the geosynthetics manufacturing plant(s) during manufacture of the liner material for this project and to observe manufacturing methods and quality control of manufactured materials. If appropriate, the Geotechnical CQA Officer or his/her designee shall review the manufacturing process, quality control, laboratory facilities and testing procedures.

During the plant visit, those visiting shall:

- Observe that the geosynthetic properties presented in the Liner Manufacturer's certification documents meet the Project Specifications.

- Verify that the measurements of properties by the Liner Manufacturer are properly documented and test methods used are acceptable.

- Spot inspect some of the geomembrane rolls and verify that they are free of holes, blisters, or any sign of contamination by foreign matter.

- Review packaging and transportation procedures to verify that these procedures are not damaging the geosynthetics.

- Observe that roll packages have a label indicating the name of the Liner Manufacturer, type of geosynthetic, its roll/panel number and other required information.

- Verify that extrusion rods and/or beads are derived from the same base resin type as the geomembrane.

5.0 GEOTECHNICAL CQA MONITORING FOR EARTH MATERIALS

5.1 GENERAL

Construction of the earth materials portion of the composite liner system shall be performed in accordance with the Project Drawings and Specifications and shall be continuously observed, and routinely sampled and tested by the Geotechnical CQA Monitors for the physical parameters described in this section.

The testing frequency presented herein is a minimum. Additional tests will be conducted by the Geotechnical CQA Monitor for retests and at any time that in the opinion of the Geotechnical CQA Monitor, additional testing is required and/or a deficiency is suspected. Retests of previously failed areas will be performed at the discretion of the Geotechnical CQA Monitor when, in his/her opinion, sufficient reworking of the area has been performed to warrant a retest.

5.2 LOW-PERMEABILITY MATERIALS

The low-permeability layer of the composite liner system will be constructed with on-site or import soils derived from a source approved by the Geotechnical Consultant. Low-permeability liner materials will be evaluated by the Geotechnical Consultant according to the following minimum testing schedule in order to characterize material properties:

Low-Permeability Import Material Testing Type and Frequency

Test Description	Test Designation	Minimum Test Frequency
Particle Size Analysis	ASTM D422	One per 2000 yds^3 stockpiled or one per production day (minimum)
Atterberg Limits	ASTM D4318	One per 2000 yds^3 stockpiled or one per production day (minimum)
Classification of Soils for Engineering Purposes	ASTM D2487	One per 2000 yds^3 stockpiled or one per production day (minimum)
Processed Moisture Content (following moisture conditioning)	ASTM D4643 (microwave) or ASTM D2216 (oven)	Two per construction day
Laboratory Permeability	ASTM D5084/EPA 9100 or USBR Modified E-13	One per 10,000 c.y
Moisture/Density Relationship	ASTM D1557	One per 10,000 c.y.
Visual Inspection	ASTM D2488	Daily while stockpiling

No soils other than those obtained from the approved borrow source and/or approved by the Geotechnical Consultant are to be used in liner construction.

5.3 DEMONSTRATION FILL (TEST FILL PAD)

A Demonstration Fill (Test Fill Pad) will be constructed prior to actual liner construction to evaluate both the low-permeability soil proposed for liner construction and the Contractor's equipment and methods for constructing and maintaining the integrity of the low-permeability liner soils. The Demonstration Fill will be constructed by the Contractor selected to complete liner construction and as specified in the Project Specifications. Construction of the Demonstration Fill shall be completed a minimum of two weeks prior to the actual low-permeability liner construction. The Contractor shall construct the Demonstration Fill using the same earthwork equipment and Specifications to be used for liner construction to determine if the specified density/moisture content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness.

Soil sampling will be performed by the Geotechnical CQA Monitor(s) during and after construction of the Demonstration Fill to provide data regarding soil properties obtainable using the proposed design and construction methods. All criteria for Demonstration Fill construction, including low-permeability material processing, amount of compaction, moisture content, etc., will be the same as those required and anticipated for actual liner construction.

The purpose of the Demonstration Fill is to: 1) evaluate the performance of the construction equipment to be used for soil blending, processing, placement and maintaining the low-permeability soils under actual construction conditions; 2) evaluate the field performance of the low-permeability soil material through laboratory and field tests; 3) compare field (BAT) and laboratory permeability test results; and 4) develop a database of test results and performance standards prior to full-scale liner construction in order to substantiate the Construction Specifications. If necessary, the results from the Demonstration Fill construction and testing program will be used to modify the Project Specifications for low-permeability liner construction.

The Demonstration Fill will measure roughly 150 feet by 50 feet and will consist of an approximately 24-inch thick section of blended, processed, cured and compacted low-permeability soils, placed on slope and floor areas. The Demonstration Fill shall be constructed using the methods, materials and equipment to be employed during construction of the actual low-permeability layer. Processed low-permeability materials will be placed in six to eight inch lifts. Construction will be continuously observed and tested by the Geotechnical CQA Monitor and/or his/her representative.

The testing frequency used in construction and monitoring of the Demonstration Fill will be more stringent than that to be maintained during construction of the actual liner. Minimum testing requirements for Demonstration Fill construction will include:

1. Full-Time observation.
2. Density tests (ASTM D1556, D2937, or D2922) taken at a rate of at least one (1) test per 100 cubic yards of fill placed or one (1) per 6 inches of fill thickness. At a minimum, ten (10) in-place moisture/density tests will be completed.
3. At least two (2) maximum density tests (ASTM D1557) will be completed.
4. Five (5) in-situ BAT permeability tests will be conducted.
5. Five (5) laboratory permeability tests on relatively undisturbed samples (Modified USBR E-13 or ASTM D5084) will be conducted including at least one triaxial cell permeability test (ASTM D5084).
6. Five (5) Atterberg Limit tests (ASTM D4318) and five (5) grain size analyses (ASTM D422) will be completed.

5.4 LOW-PERMEABILITY FILL PLACEMENT

Select low-permeability liner soils shall be screened (if necessary), dried, and/or moisture conditioned until uniformly blended material characteristics and moisture condition are attained. Moisture conditioning, if required will allow for a minimum 48-hour curing period. Field and laboratory testing for moisture content, in-place dry density, and other engineering properties including saturated hydraulic conductivity during construction of the low-permeability layer of the liner system will be completed according to the following minimum schedule:

Low-Permeability Fill Testing Type and Frequency

Test Description	Test Designation	Minimum Test Frequency
Processed Moisture Content (following moisture conditioning)	ASTM D4643 (microwave) or ASTM D2216 (oven)	Two per construction day
Moisture-Density Relationship	ASTM D1557	One per 5,000 cubic yards or per change in material type
In-Place Moisture-Density (Nuclear and/or Drive Ring)	ASTM D2922 ASTM D3017 ASTM D2937	One per 250 cubic yards placed
In-Place Density and Moisture Content (Sand-Cone)	ASTM D1556	One per 1,000 cubic yards placed or 20 percent of total In-Place tests (whichever is greater)
Particle Size Analysis	ASTM D422	One per 5,000 yd^3 (conducted on samples retrieved for laboratory permeability testing)
Atterberg Limits	ASTM D4318	One per 5,000 yd^3 (conducted on samples retrieved for laboratory permeability testing)
Laboratory Permeability	ASTM D5084/EPA 9100 or USBR Modified E-13	One per 5,000 cubic yards placed
BAT Permeability		One per 2,500 cubic yards placed
Visual Inspection	ASTM D2488	Daily

5.5 ACCEPTANCE CRITERIA

5.5.1 GENERAL

Where test results indicate that the lift thickness, maximum particle size, homogeneity of material, cure time, moisture content, density, or permeability of any portion of the work is below the project requirements, that particular portion shall be retested and/or reworked or replaced until the required condition has been attained and the resulting product meets or exceeds the requirements of the Project Specifications. No additional fill shall be placed over an area until the existing fill has been tested horizontally and vertically and determined by the Geotechnical CQA Monitor to meet the Project Earthwork Specifications. The area to be reworked will be verified by survey if in the opinion of the Geotechnical CQA Monitor conditions warrant.

5.5.2 MOISTURE CONTENT AND DENSITY

If in the opinion of the Geotechnical CQA Officer or the Senior Geotechnical CQA Technician, low-permeability materials which have been placed and/or are

ready to be placed, do not visually have a uniform and homogeneous moisture content throughout the material in question, these materials will be removed, without testing, and will be reprocessed and/or reworked until, in the opinion of the Geotechnical CQA Officer or his/her designated representative, they are uniform in appearance.

For all fill materials placed, if test results indicate a relative dry density of less than that required or a moisture content outside the limits specified, then the area will be considered inadequate and will be reworked. Any reworked areas will be retested by the Geotechnical CQA Monitor to verify the reworked area meets the density and moisture content requirements.

The following table lists the minimum moisture/density requirements for fill materials placed. The in-place moisture content and dry density requirements are relative to the maximum dry density and optimum moisture content as determined by ASTM D1557.

Fill Type	Minimum Density (percent)	Moisture Content
Low-Permeability Layer Material	90	2 – 4% above optimum
Unclassified Fill	90	Optimum to 2% above
Protective Cover Soil	85	Optimum ± 2%

5.5.3 PERMEABILITY

If a BAT or laboratory permeability test results in a value exceeding the defined maximum of 1.0 E-07 cm/sec, two (2) additional tests of the same type will be taken in the immediate vicinity. [At the discretion of the Geotechnical CQA Consultant, BAT permeability tests may be taken in lieu of failed laboratory tests to expedite the CQA testing procedure.] If either of the additional tests fails to meet the minimum requirements, the area represented by the test will be considered inadequate and will be removed or reprocessed and recompacted.

5.5.4 LIFT THICKNESS AND PROCESSING

If at any time the CQA Monitor observes an uncompacted lift thickness in excess of eight inches or observes material being placed without meeting the requirements for processing, stockpiling and curing, the Contractor shall immediately discontinue placing additional fills in that area. For an over thick lift, the Contractor shall immediately blade the surface to reduce the lift thickness to the Project Specifications prior to compaction. If inadequately mixed materials are placed, the Contractor shall immediately remove these materials and return them to the stockpile/processing area where they will be reprocessed.

5.5.5 GEOMEMBRANE SUBGRADE

The CQA Monitor and the geomembrane installation Contractor will observe and approve the geomembrane subgrade prior to geosynthetic material deployment. The finish surface shall be free of abrupt breaks, sharp objects, or other foreign material which may damage the overlying geomembrane. The subgrade shall be unyielding, smooth and uniform and the surface shall not be pebbly or tracked and rutted by equipment.
Immediately prior to geomembrane deployment, all subgrade surfaces (i.e., floor and slopes), will be proof-rolled with a steel drum roller weighting not less than 200 pounds per lineal inch of drum width.

Geomembrane deployment shall not proceed until the surface has been approved by the CQA Monitor and accepted by the geomembrane installation Contractor.

6.0 GEOTECHNICAL CQA MONITORING FOR GEOSYNTHETICS

6.1 GEOMEMBRANE (HDPE)

Delivery of geomembrane to the site will not be allowed until all required documentation and/or certifications are approved by the CM/Geotechnical CQA Team. It is the responsibility of the Contractor/Subcontractor to ensure that all required documentation and/or certifications are approved prior to shipment.

6.1.1 HDPE MANUFACTURING

Prior to the delivery of any geosynthetic material, the Liner Manufacturer shall provide the Construction Manager with the following:

- A properties sheet for the rolls to be delivered including all specified properties measured using test methods indicated in the specifications.
- The sampling procedure and results of testing.
- A certification for each roll stating that property values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet the project specifications.
- The measurements of properties by the Liner Manufacturer are properly documented and that the test methods used are acceptable.

Prior to shipment, the Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geomembrane. The quality control certificate(s) shall be signed by a responsible person employed by the Liner Manufacturer and shall include:

- Lot and roll numbers and identification.
- Sampling procedures and results of quality control tests. At a minimum, results shall be given for those properties identified in the Project Specifications.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls related to it.
- Review the quality control certificates and verify that the certified roll properties meet the specifications.

6.1.2 GEOMEMBRANE DELIVERY

Prior to delivery, all individual roll manufacturer certifications required by this document and/or the Project Specifications must be received and approved by the Construction Manager. Delivery of any unapproved roll will not be allowed and unapproved rolls will be transported off-site at the Contractors expense.

6.1.2.1 Transportation and Handling

All transportation and on-site handling of the geomembrane is the responsibility of the Contractor and Liner Subcontractor.

The Geotechnical CQA Officer shall observe the handling equipment used on the site and provide comment on whether it might pose a risk of damage to the geomembrane. The Geotechnical CQA Officer will also observe the Contractor and Liner Subcontractor personnel's handling of the geomembrane and provide comment on whether appropriate care is being taken. Finally, the Geotechnical CQA monitor shall verify that all documentation required upon delivery has been received.

Upon delivery at the site, the Contractor, Liner Subcontractor and the Geotechnical CQA Monitor shall complete a surface observation of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Officer shall report the following to the Construction Manager:

- Rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws.

- Rolls which visually include minor repairable flaws.

Any damaged rolls shall be rejected and removed from the site or be stored at a location separate from accepted rolls as designated by the Construction Manager. All rolls which do not have proper Liner Manufacturer's documentation shall be removed from the site at the Contractors expense until all required documentation has been received and approved.

A log of all HDPE received shall be maintained by the Geotechnical CQA Monitors and recorded on an appropriate form (Form B-1 attached).

6.1.2.2 Geomembrane Storage

The Contractor and Liner Subcontractor shall be responsible for storage of the HDPE on-site and shall ensure the storage is consistent with the Manufacturer's recommendations. The Contractor shall coordinate with the Construction Manager to ensure that storage space is provided in a location (or several locations) such that on-site transportation and handling are minimized. Storage space shall be protected by the Contractor and Liner Subcontractor from theft, vandalism, and damage from actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the materials are not stored directly on the ground and storage of the HDPE is completed in a fashion that protects against damage.

6.1.3 HDPE CONFORMANCE TESTING

6.1.3.1 Tests

Upon delivery of the HDPE, the Contractor or Liner Subcontractor shall ensure that conformance samples are obtained and forwarded to the Independent Testing Laboratory at the frequency required for testing to ensure conformance with the Project Specifications. All conformance samples will be obtained in the presence of the Geotechnical CQA Monitor or his/her designated representative.

At a minimum, conformance tests will include determination of the following characteristics for the HDPE:

- Density (ASTM D1505A).

- Environmental Stress Crack (ASTM D5397).

- Tear Resistance (ASTM D1004 Die C).

- Carbon black content (ASTM D1603).
- Thickness (ASTM D5199).
- Tensile characteristics (yield strength, elongation at yield, break strength, elongation at break) (ASTM D638).
- Interface shear strength testing as described in the Project Specifications. Direct shear testing for interface strength shall be carried out in accordance with ASTM D-5321 "Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method." Issues and procedures related to soil preparation shall be governed by ASTM D3080.
- Puncture resistance (ASTM D4833).

Where optional procedures are noted in the test method, the requirements of the Project Specifications shall prevail.

6.1.3.2 Sampling and Testing Frequency

Unless otherwise specified, conformance samples shall be taken and tested at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of tests. Testing for interface shear will be conducted at a rate of one per 200,000 square feet.

6.1.3.3 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be 3 ft. long by the roll width. The Geotechnical CQA Monitors shall mark the machine direction on the samples with an arrow, and the Liner Manufacturer's roll identification number.

6.1.3.4 Test Results

The results of Conformance Testing will be documented on the appropriate forms and the Geotechnical CQA Officer shall examine all conformance testing results and report any non-conformance to the Construction Manager, the Contractor and the Lining Subcontractor.

All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and

the HDPE material can be accepted. If the second test fails, the Liner Subcontractor shall remove all material represented by the sample from the work area.

All conformance test results must be approved by the Construction Manager prior to the HDPE represented by the test being approved for deployment/installation. The decision of the Construction Manager shall be final.

6.1.4 HDPE INSTALLATION

6.1.4.1 Earthwork

Surface Preparation

The Contractor shall be responsible for preparing the supporting soil according to the Project Specifications.

Prior to liner installation, the Contractor and Liner Subcontractor shall verify and the Construction Manager and Geotechnical CQA Monitor shall observe that:

- All lines and grades have been checked by survey and approved by the Construction Manager.
- The subgrade has been prepared in accordance with the Project Specifications.
- The surface has been rolled and compacted to be free of surface irregularities, loose soil, and protrusions.
- The supporting soil surfaces do not contain stones or other sharp protrusions which could damage the HDPE.
- There are no excessively soft areas which could result in HDPE damage.
- All construction stakes, hubs or other items used for grade control and/or verification have been removed.
- The Liner Subcontractor has certified in writing that the surface on which the HDPE will be installed is acceptable using an appropriate form (Form B-3 attached).

The certificate of acceptance shall be given by the Liner Subcontractor to the Contractor and the Construction Manager prior to commencement of HDPE installation in the area under consideration. The Geotechnical CQA Monitors shall have a copy of this certificate before installation of HDPE commences in any given area.

After the supporting surface has been accepted by the Contractor and Liner Subcontractor, it shall be the Contractor and Liner Subcontractor's responsibility to indicate to the Construction Manager any change in the supporting soil condition that may require repair work. If the Construction Manager concurs with the Contractor and Liner Subcontractor, then the Construction Manager shall coordinate the repair of the supporting surface. The subject area will also be observed by the Geotechnical CQA Monitors who shall have the authority to reject an area even after it has been accepted by the Contractor and Liner Subcontractor.

Anchor Trench

Anchor trenches shall be excavated to the lines and widths shown on the Project Drawings, prior to HDPE placement. The Geotechnical CQA Monitors shall observe that the anchor trenches have been constructed according to the project documents.

Slightly rounded corners shall be provided where the HDPE adjoins the trench so as to avoid sharp bends in the HDPE. No loose soil shall be allowed to underlie the HDPE in the anchor trench.

Anchor trench backfill shall be compacted to at least 90 percent relative compaction (ASTM D1557) as outlined in the Specifications.

Care shall be taken when backfilling the trenches to prevent any damage to the geosynthetics. The Geotechnical CQA Monitors shall observe the backfilling operation and advise the Construction Manager of any problems.

6.1.4.2 HDPE Placement

Field Panel Identification

A field panel (sheet) is a discrete and integral area of HDPE which is to be seamed in the field along the edges to other field panels (i.e., a field panel is a roll or a single portion of a single roll). The Contractor or Liner Subcontractor shall assign each panel over 25 sq. feet an identification code which shall be agreed to and used by the Geotechnical CQA Monitors, Construction Manager, Contractor and the Liner Subcontractor. The Contractor or Liner Subcontractor shall locate the code with identifying roll number near the middle of panels less than 50 feet in length and at both ends of any panel over 50 feet in length. The Geotechnical CQA Monitors shall establish a chart showing correspondence between roll numbers, certification reports, and the panel identification code. The field panel identification code shall be used for all Geotechnical CQA records. An HDPE panel placement log will be maintained by the Geotechnical CQA Monitors on appropriate forms (Forms B-4 and B-5 attached).

Field Panel Placement

The Geotechnical CQA Monitors shall record the identification code, location and date of installation of each field panel.

During panel placement, the Geotechnical CQA Monitors shall:

- Verify that field panels are installed in general accordance with the panel layout plan, as approved or modified by the Construction Manager/Engineer.
- Observe the panel surface as it is deployed and record all panel defects and disposition of the defects. All repairs are to be made in accordance with the Specifications.
- Observe that the equipment used does not damage the HDPE by handling, trafficking, leakage of hydrocarbons, or by other means.
- Observe that the surface beneath the HDPE has not deteriorated since previous acceptance.
- Observe that there are no stones, construction debris, or other items beneath the HDPE which could cause damage.
- Observe that the HDPE is not dragged across an unprepared surface. If the HDPE is dragged across an unprepared surface, it shall be inspected for scratches and repaired or rejected, if necessary.
- Observe that the method used to unroll the panels does not cause scratches or crimps in the HDPE and does not damage the supporting soil surface.
- Record weather conditions including temperature, wind, and humidity. The HDPE shall not be deployed in the presence of excess moisture (fog, dew, mist, etc.), high winds and extreme temperatures as determined by the Geotechnical CQA Officer.
- Observe that people working during the installation of HDPE do not smoke, wear shoes which could damage the HDPE, or engage in activities which could damage the HDPE.
- Observe that the method used to deploy the HDPE panels minimizes wrinkles and that the panels are anchored to prevent movement by the wind.
- Observe that direct contact with the HDPE is minimized; (i.e., the HDPE is protected by geotextiles, extra HDPE, or other suitable materials, in areas where excessive traffic may be expected).

The Geotechnical CQA Monitors shall inform the Contractor, the Liner Subcontractor and the Construction Manager if the above conditions are not met.

After placement and prior to seaming, the Geotechnical CQA Monitors shall inspect each panel for damage. The Geotechnical CQA Monitors shall advise the Construction Manager which panels, or portions of panels, should be rejected, repaired, or accepted. Damaged panels or portions of damaged panels which have been rejected shall be marked and their removal from the work area recorded by the Geotechnical CQA Monitors.

6.1.4.3 Field Seaming

The Contractor shall provide the Construction Manager and Geotechnical CQA Officer with a seam and panel layout plan and shall update this plan daily as the job proceeds. No panels shall be seamed until the panel layout plan has been approved by the Construction Manager. A seam numbering system shall be agreed to by the Geotechnical CQA Monitors, Construction Manager, Contractor and Liner Subcontractor prior to the start of seaming operations.

Prior to seaming, each seaming apparatus (welder) shall be tested in accordance with the Specifications to determine if the equipment is functioning properly. The Geotechnical CQA Monitors shall observe all trial weld operations and record the results. It is important that the trial welds be completed under conditions similar to those under which the panels will be seamed. If at any time the Geotechnical CQA Monitor believes that an operator or seaming apparatus is not functioning properly, a test shall be performed on a trial weld. If there are large changes in temperature, humidity, or wind speed, the trial weld test shall be repeated. Laboratory tests may be carried out at the discretion of the Geotechnical CQA Monitors to verify field test results.

During seaming operations the Geotechnical CQA Monitors shall observe that:

- The Liner Subcontractor has the number of welders and spare parts agreed to in the pre-construction meeting.
- Equipment used for seaming will not damage the HDPE.
- The extruder is purged prior to beginning a seam until all the heat-degraded extrudate is removed (extrusion welding only).
- Seam grinding has been completed less than 1 hour before seam welding (extrusion welding only).
- The ambient temperature measured 6 inches above the HDPE surface is between 40 and 105 degrees Fahrenheit and relative humidity is less than 80 percent.

- The end of welds more than 5 minutes old, are ground to expose new material before restarting a weld (extrusion welding only).
- The weld is free of dust and other debris.
- For cross seams, the seam is ground to a smooth incline prior to welding.
- The seams are overlapped in a downgradient direction with a minimum overlap of 4 inches.
- No solvents or adhesives are present in the seam area.
- The procedure used to temporarily hold the panels together does not damage the panels and does not preclude Geotechnical CQA testing.
- The panels are being seamed in accordance with the Project Plans and Specifications using approved equipment with gauges giving applicable temperatures.
- There is no free moisture in the weld area.
- The electric generator is placed on a smooth base such that no damage occurs to the HDPE.
- A smooth insulating plate or fabric is placed beneath the hot welding apparatus after use.
- The geomembrane is protected from damage in heavily trafficked areas.

The Geotechnical CQA Monitors shall log all appropriate temperatures and conditions, and shall log and report to the Geotechnical CQA Officer any non-compliance.

Trial Seams

Trial seam samples are not removed from installed seams, but are made along side the seaming work area by the Liner Subcontractor using a fragment of the same HDPE sheet and the same installation procedures as for the HDPE installation itself. As such, they are considered nondestructive samples. Such trial seams shall be made at the beginning of each seaming period (start of day, mid-day, and anytime the equipment is shut down or the seaming operation is suspended for more than 1/2 hour) for each piece of seaming equipment used that day. In addition, each welder shall make at least one trial seam each day. Trial seams shall be made under the same conditions as those anticipated for actual seams.

The trial seam sample shall be at least 3 ft. long by 1 ft. plus the seam width wide (after seaming) with the seam centered lengthwise. Seam overlap shall be as per the Specifications.

Two opposite specimens, each 1 inch wide, shall be cut from the trial seam sample by the Contractor and/or Liner Subcontractor. Under the observation of a Geotechnical CQA Monitor, the specimens shall be tested by the Liner Subcontractor in shear and peel using a field tensiometer to verify that seams satisfy peel and tensile strength requirements. If a specimen fails, the seaming equipment and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full trial welds are achieved. After completing a successful trial/nondestructive sample, the Contractor and/or Liner Subcontractor shall cut a 2' x 2' remnant from the sample and mark the welder number, date, time, ambient temperature, welder temperature, and speed and submit it to the Geotechnical CQA Monitor who will assign an identification number and enter the information on the non-destructive sample form.

The results of field tests carried out on trial seams shall be documented by the Geotechnical CQA Monitors on appropriate form (Form B-6 attached).

General Seaming Procedure

Unless otherwise specified, the general seaming procedure to be used by the Contractor and/or Liner Subcontractor shall be as follows:

- All HDPE seams shall be overlapped a minimum of four (4) inches.
- "Fishmouths" or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut "fishmouths" or wrinkles shall be seamed and any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same HDPE extending a minimum of 6 inches beyond the cut in all directions. All corners of the patch shall be rounded with a 1-inch minimum radius.
- Adjacent to anchor trenches, seaming shall extend up the panels a minimum of 12 inches past the crest of the anchor trench.
- All cross seams shall be offset at least two feet from the cross seam of the adjacent panel and be extrusion or wedge welded where they intersect.

The Geotechnical CQA Monitors shall observe that the above seaming procedures are followed, and shall inform the Construction Manager if they are not.

6.1.5 CONSTRUCTION TESTING

6.1.5.1 Nondestructive Seam Testing

The Contractor and/or Liner Subcontractor shall non-destructively test all field seams over their full length using a vacuum test unit, spark detector, or an air pressure test (for double wedge fusion seams only), as described below. The purpose of nondestructive tests is to check the continuity of seams. It does not provide any information on seam strength. Continuity testing shall be carried out as the seaming work progresses, not at the completion of field seaming.

Visual Inspection

All seams shall be visually evaluated by the Contractor and/or Liner Subcontractor as the installation progresses and again at completion of the installation. Defective and questionable sections shall be clearly marked and repaired as necessary.

Vacuum Box Testing

If the fillet weld, extrusion lap weld or single hot-wedge fusion lap weld technique is used to weld seams, the Contractor and/or Liner Subcontractor shall further test all seams and repairs in the HDPE by vacuum box. The vacuum box shall be an American Vacuum Seam Tester, Series A100 as manufactured by American Parts and Service Company, Alhambra, California, or an approved equal. All vacuum box testing shall be done in the presence of the Geotechnical CQA Monitor. The area to be tested shall be cleaned of all dust, debris, dirt and other foreign matter. A soap solution shall be applied to the test area with a brush, paint roller or spray bottle and a minimum vacuum of 10 inches of mercury (Hg) (5 psi) shall be induced and held as long as necessary to visually inspect and mark for repair any suspicious areas as evidenced by bubbles in the soap solution.

Spark Testing

If the fillet weld is used to weld seams, the Contractor and/or Liner Subcontractor may, in lieu of vacuum box testing, test all seams and repairs in the HDPE liner by using a high voltage spark detector, similar to Tinker and Rasor Holiday Detector (Model AP-W). The setting of the detector shall be 20,000 volts. In order to conduct this test, all seams to be tested shall be provided with 24-30 gauge copper wires properly embedded in the seams and grounded. All spark testing shall be done in the presence of the Geotechnical CQA Monitor. All defective areas shall be marked for repair.

Air Pressure Test

If the double hot-wedge welding technique is used, the Contractor and/or Liner Subcontractor shall further test all seams in the HDPE lining by using the air pressure test which consists of inserting a needle with gauge in the air space between welds. Air shall be pumped to 40 psi within the weld void and held for at least 5 minutes. If the pressure loss exceeds 2 psi within the weld void during air pressure testing, the outside weld edge (not free edge) shall be sprayed with a soap solution and visually examined for bubbles. If no bubbles appear, the problem is with the inside weld and the seam is acceptable. If any bubbles appear, the defect shall be repaired by extrusion welding and tested by vacuum box and spark detector.

If pressure loss is not more than 2 psi, the opposite end of the seam will be punctured to release the air. If a blockage is present, it will be located and tests on both sides of the blockage will be completed. All penetration holes created during testing shall be sealed by patching and extrusion welding.

Electrical Leak Location Survey

To aid in CQA monitoring of the geomembrane construction, an independent contractor will conduct an electrical leak location survey as part of the final quality control for the geomembrane installation. The method is designed to identify holes in the geomembrane liner after the LCRS gravel, or LCRS gravel and operations layer soil, has been placed. The leak location survey contractor will make point-by-point electrical measurements on the soil above and below the liner. By this process, because the geomembrane liner is an electrical insulator, current will flow only through leaks in the liner, producing localized anomalous areas of high current density near the leaks. Any identified electrical anomaly will be investigated and the liner repaired as described in Section 6.1.6, as necessary.

Responsibilities of the Geotechnical CQA Monitors

The Geotechnical CQA Monitor/Officer shall:

- Observe and record the continuity of all testing.
- Record the location seam/panel number, date, time, equipment number, Geotechnical CQA Monitor name , test number, welding technician's name, weld, sheet and ambient temperatures and results of all testing on appropriate forms (Form B-7 attached).
- Mark the failed areas with a waterproof marker compatible with the lining material and inform the Contractor and/or Liner Subcontractor and the Construction Manager of any required repairs.

- Observe that all testing is completed in accordance with the Project Specifications.

- Observe that all repairs are completed and tested in accordance with the Project Specifications.

6.1.5.2 Destructive Seam Testing

Destructive seam tests shall be performed at selected locations. The purpose of these tests is to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of all field seaming.

Destructive sampling involves samples which have been removed from the installed field seams by the Contractor/Liner Subcontractor. Test locations shall be determined at the discretion of the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor shall not be informed in advance of the locations where the seam samples will be made or will be removed.

Destructive samples shall be delivered to the Geotechnical CQA Officer by the Contractor/Liner Subcontractor and shipped to the Independent Testing Laboratory. All costs associated with the collection, repair, shipping and testing of destructive samples will be borne by the Contractor/Liner Subcontractor.

A minimum of one destructive sample per 500 feet of field seam shall be obtained. This average frequency will be used for the entire installation with the actual frequency of samples based on performance as determined by the Geotechnical CQA Officer.

Additional samples may be removed if the Geotechnical CQA Monitor observes a suspect seam.

6.1.5.3 Sampling Procedures

Samples shall be made or removed by the Contractor/Liner Subcontractor at locations selected by the Geotechnical CQA Monitors as the seaming operation progresses. The Geotechnical CQA Monitor shall:

- Observe making and/or removal of samples.

- Mark each sample with an identifying number which contains the seam number. (For nondestructive samples the seam number welded just prior to making a sample will be marked on the sample).

- Record sample locations on the panel layout drawing and enter the information on a Destructive Sample Log Form.

- Record the sample location, date and time taken, weather conditions, and reason the sample was made and/or taken (e.g., random sample, visual appearance, result of a previous failure, etc.).

- Mark sample identifying number on HDPE adjacent to the location where the sample was taken.

All holes in the HDPE resulting from destructive seam sampling shall be immediately repaired in accordance with repair procedures described herein. The continuity of the new seams in the repaired area shall be tested according to procedures described herein.

6.1.5.4 Size of Samples

Two types of samples shall be made or removed at each location. First, two samples shall be removed for field testing. Each of these samples shall be 1 inch wide with a length of 12 inches plus the seam width. For destructive sampling, the sample shall be taken perpendicular to the seam and the distance between these two samples shall be 38 inches. Samples designated for laboratory testing shall be that portion of seam located between the two samples taken for field testing. The samples for laboratory testing shall be 36 inches long with a width of 12 inches plus the seam width. The seam shall be centered lengthwise. The samples for laboratory testing shall be cut into three equal parts and distributed as follows:

- One part for the Independent Testing Laboratory for testing.
- One part to the Contractor/Liner Subcontractor.
- One part to the Construction Manager for archive storage.

6.1.5.5 Field Testing

The two 1 inch wide samples shall be tested in the field for peel adhesion and bonded seam strength (shear) by the Contractor/Liner Subcontractor, and shall not fail in the seam, but shall have a film tearing bond (FTB). If one or both of the samples fails in either peel or shear, the Contractor/Liner Subcontractor can, at his/her discretion, (1) reconstruct or cap strip the seam between passed test locations, or (2) take two additional test samples 10 feet on either side of the point of the failed test and repeat this procedure. If the second test passes, the Contractor/Liner Subcontractor shall reconstruct or cap strip the same between the two passed test locations. If subsequent tests fail, the procedure is repeated until the length of the poor quality seam is established. Repeated failures indicate that either the seaming equipment and/or operator is not performing properly, and appropriate action shall be taken.

6.1.5.6 Laboratory Testing

Once the field tests have passed, a sample shall be recovered from between passing field sample locations for testing by the Independent Testing Laboratory. Destructive test samples shall be packaged and shipped to the laboratory by the Geotechnical CQA Monitors and will be handled in a manner which will not damage the test sample. The Construction Manager will be responsible for storing the archive samples.

All specimens of a field weld sample tested by the Independent Testing Laboratory shall pass. If any specimen fails, the entire sample shall be considered as a failure, and the field weld shall be rejected. In this event, the field seam(s) shall be rejected as being nonconformant with the Specifications, and corrective measures shall be implemented.

For destructive samples which have failed, corrective measures shall include a rerun of the weld test using the same sample. If the second test passes, the Geotechnical CQA Monitor may assume an error was made in the first test and the field seam may be accepted. If the second test fails, the Contractor/Liner Subcontractor shall reconstruct or cap strip the field seam between any two previous passed seam locations which include the failed seam or shall go on both sides of the failed seam location (10-feet minimum), take another sample each side and test both in the independent laboratory.

If both samples pass, the Contractor/Liner Subcontractor shall reconstruct or cap strip the field seam between the two passing locations. If either fails, the Contractor/Liner Subcontractor shall repeat the process of taking samples for testing by the Independent Testing Laboratory. In all cases, acceptable field seams must be bounded by two passed test locations. In cases involving more than 50 feet of reconstructed or cap stripped seam, the reconstructed or cap stripped seam shall also be tested. The results of the Independent Testing Laboratory govern seam acceptance. In no case shall field testing of installed seams be used for final acceptance.

Testing shall include peel adhesion and bonded seam strength (shear; ASTM D6392). At least five specimens each shall be tested for peel and sheer. Minimum test values are presented in the Specifications. The Independent Testing Laboratory shall provide test results within 24 hours after receipt of samples for testing. Certified test results shall be provided within 5 days. The Geotechnical CQA Monitor shall document all test results on an appropriate form (Form B-8 attached) and shall immediately notify the Geotechnical CQA Officer, Construction Manager and/or Contractor/Liner Subcontractor in the event of a failed test.

The Contractor/Liner Subcontractor's laboratory test results shall be presented to the Geotechnical CQA Officer for comments.

6.1.6 DEFECTS AND REPAIRS

6.1.6.1 Identification

All seams and non-seam areas of the HDPE shall be examined by the Geotechnical CQA Monitors for identification of defects, holes, blisters, undispersed raw materials and any sign of contamination by foreign matter. Because light reflected by the HDPE helps to detect defects, the surface of the HDPE shall be clean at the time of examination. The HDPE surface shall be cleaned by the Contractor/Liner Subcontractor if the amount of dust or mud inhibits examination.

Each suspect location as identified by the Geotechnical CQA Monitors, both in seam and non-seam areas, shall be non-destructively tested using the methods described herein, as appropriate. Each location which fails the nondestructive testing shall be marked by the Geotechnical CQA Monitor and then repaired and re-tested by the Contractor/Liner Subcontractor. Work shall not proceed with any materials which will cover locations which have been repaired until laboratory test results with passing values have been obtained.

6.1.6.2 Repair Procedures

Any portion of the HDPE with a flaw or which fails a nondestructive or destructive test shall be repaired in accordance with the Specifications. The Geotechnical CQA Monitor shall locate and describe all repairs on the appropriate forms. Repair procedures include:

- Patching - used to repair large holes, tears, large panel defects, and destructive sample locations which are less than 25 sq. feet in total area.
- Extrusion - used to repair relatively small defects in panels and seams.
- Capping - used to repair failed welds or liner seams where welds cannot be non-destructively tested.
- Removal - used to replace areas with large defects where the preceding methods are not appropriate. Also used to remove excess material (wrinkles) from the installed HDPE.

6.1.6.3 Seam Test Summary

Documentation of all nondestructive and destructive seam testing results, including repairs, shall be summarized by the Geotechnical CQA Officer on Form B-9 attached.

6.1.7 WRINKLES

When placing soil or drain materials over the HDPE, temperature changes or creep may cause wrinkles to develop in the HDPE. Any wrinkles which can fold over shall be repaired either by cutting out excess material or, if possible, allowing the HDPE to contract due to temperature reduction. In no case shall material be placed over the HDPE which could result in the HDPE folding. All folded HDPE shall be removed. No material shall be placed in areas where liner is not in contact with the supporting subgrade.

6.1.8 ANCHOR TRENCH

The anchor trench shall be adequately drained to prevent ponding or softening of the adjacent soils while the trench is open. The anchor trench shall be backfilled and compacted as outlined in the Specifications. Fill soils shall consist of on-site granular soil essentially free of organic and deleterious material and approved by the Geotechnical CQA Monitor and Construction Manager. The material shall have a maximum particle size of 1 inch.

Care shall be taken when backfilling the trenches to prevent any damage to the geosynthetics. The Geotechnical CQA Monitor shall observe the bottom of the trenches prior to fill placement to ensure they are free of loose and disturbed materials. The Geotechnical CQA Monitor shall also observe the backfilling and compaction operation, and shall notify the Geotechnical CQA Officer and the Construction Manager of work performed not in accordance with the Project Specifications.

6.1.9 HDPE ACCEPTANCE

The Contractor/Liner Subcontractor shall retain all ownership and responsibility for the HDPE until acceptance by the Owner. The HDPE shall be accepted by Owner when:

- The installation is finished and approved.
- All seams have been inspected and approved.
- All required laboratory tests have been completed and approved.

- All required Contractor/Liner Subcontractor supplied documentation has been received and approved.

- All record drawings have been completed and approved.

6.1.10 LINER MATERIALS

The Geotechnical CQA procedures indicated in this section are intended to allow the installation of materials in contact with the HDPE without causing damage to it.

Important points for Quality Assurance of materials in contact with HDPE include:

- A geotextile or drainage medium approved by the Construction Manager shall be installed above the HDPE.

- Equipment used for placing soil shall not be driven directly on the HDPE/geotextile.

- In heavily trafficked areas, such as access ramps, soil thickness should be at least three (3) feet over the geosynthetics.

- Placement of soils, gravels, sand or other types of earth materials on top of the HDPE/geotextile shall not be performed until all destructive and nondestructive testing has been performed and accepted.

- Placement of overlying earth materials shall be performed in a manner to minimize wrinkles. Equipment operators shall be briefed on methods of placement relative to thermal expansion and contraction of the HDPE.

- Soil material(s) placed on top of the HDPE/geotextile shall be stockpiled and displaced off the stockpile to create a cascading effect of the material on top of the HDPE/geotextile.

The Geotechnical CQA Monitors shall inform the Geotechnical CQA Officer if the above conditions are not fulfilled.

6.2 GEOSYNTHETIC CLAY LINER (GCL)

The Contractor/GCL Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet for geotextile and bentonite materials which includes all specified properties measured using test methods indicated in the Project Specifications.

- Certificates for raw bentonite and geotextile materials which indicate that materials provided meet or exceed all applicable specification requirements.
- Manufacturer's Quality Control Certificates.
- Internal shear strength certificate in accordance with specification requirements.
- A panel placement plan.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the GCL Manufacturer meet or exceed the Project Specifications.
- The measurement of properties by the GCL Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/GCL Manufacturer shall provide the Construction Manager with a quality control certificate for each GCL roll which is intended for use on the project. The quality control certificate(s) shall be signed by a responsible person employed by the Manufacturer, and shall include roll numbers and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the Project Specifications.

6.2.1 GCL DELIVERY

The Contractor/GCL Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of GCL material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the material.
- Care is used to unload the rolls.
- All documentation required by the specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitor(s) shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitor(s) shall report to the Construction

Any damaged rolls shall be rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the Manufacturer shall also be stored at a separate location until all documentation has been received and approved. A log of the GCL material(s) received shall be maintained by the Geotechnical CQA Monitor(s).

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of Manufacturer, weather, animals and other sources. The Geotechnical CQA Monitor(s) shall observe that the materials are stored in accordance with Manufacturers recommendations and are protected against damage pursuant to ASTM D4873.

6.2.2 GCL CONFORMANCE TESTING

6.2.2.1 Tests

Upon delivery of the GCL material(s), the Geotechnical CQA Monitor shall ensure that the Contractor obtains and forwards samples to the approved Independent Testing Laboratory for testing of conformance with the design specifications. Conformance tests, including interface direct shear, will be performed as detailed in the Project Specifications.

Where optional procedures are noted in the test method, the requirements of the specifications shall prevail. Updated or alternative test methods may be used to determine the physical properties of the GCL materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer.

6.2.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll(s) and shall not include the first three feet. Unless otherwise specified, samples shall be three (3) feet long by the roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturers roll identification number.

6.2.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the GCL

material represented by the sample shall be considered non-conformant with the specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the GCL material can be accepted. If the second test fails, the Contractor/GCL Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.2.3 GCL INSTALLATION

6.2.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitor(s) shall observe that:

- All lines and grades have been verified by the project surveyor.
- The supporting surface does not contain rocks or irregular surfaces which could damage the GCL.
- There are no excessive soft spots or ponded water which could result in damage to the GCL.
- The Contractor/GCL Subcontractor has certified in writing that the surface on which the GCL will be installed is acceptable.
- The Contractor/GCL Subcontractor shall give each GCL panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitor(s) and the Contractor/GCL Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports and panel numbers.

During placement, the Geotechnical CQA Monitor(s) shall:

- Observe the GCL as it is placed and record all defects and disposition of the defects (panel rejects, patch installed, etc.). All repairs are to be made in accordance with the Project Specifications.
- Observe that Manufacturer's defects do not exceed that allowed by the Project Specifications.
- Observe that equipment used does not damage the GCL by handling, traffic, leakage of hydrocarbons, or other means.

- Observe that people working during installation of the GCL do not smoke, wear shoes that could damage the GCL, or engage in other activities that could damage the GCL.

- Observe that the GCL is anchored to prevent movement by the wind.

- Observe that adjacent panels of GCL are properly overlapped and the proper amount and type of bentonite is installed along the full length of all seams.

- Observe that the number of panels deployed are covered and protected from moisture at the end of the work day.

The Geotechnical CQA Monitor(s) shall inform both the Contractor/GCL Subcontractor and the Construction Manager if the above minimum conditions are not met.

The Contractor/GCL Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No GCL shall be placed until the panel layout plan has been approved by the Construction Manager. During panel placement, the Geotechnical CQA Monitor(s) shall also observe the following:

- That GCL material is cut with an approved GCL cutter, and is not torn or ripped.

- The bentonite to be used on all seams meets the requirements of the Project Specifications.

- That the panels are overlapped and sealed in accordance with the Project Plans and Specifications.

6.2.4 REPAIRS

Any necessary repairs to the GCL shall be made with approved GCL material, using approved overlaps, materials, equipment and techniques. The patch size shall be 12 inches or larger in all directions than the area to be patched.

6.3 GEOTEXTILES

The Contractor/Liner Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet which includes all specified properties measured using test methods indicated in the specifications.

- A description of the sampling procedure and appropriate test results.

- A certification that values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet or exceed the project specifications.
- The measurement of properties by the Liner Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geotextile. The quality control certificate shall be signed by a responsible person employed by the Liner Manufacturer, and shall include roll number and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the project specifications.

6.3.1 GEOTEXTILE DELIVERY

The Contractor/Liner Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of geotextile material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the geotextile.
- Care is used to unload the rolls.
- All documentation required by the Specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitors shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitors shall indicate to the Geotechnical CQA Officer any rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws. These rolls shall be clearly marked as rejected.

Any damaged rolls shall be rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the manufacturer shall also be stored at a separate location until all documentation has been received and

approved. A log of the geotextile material(s) received shall be maintained by the Geotechnical CQA Monitors on an appropriate form (Form B-10 attached).

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the material is not stored directly on the ground and that storage of the geotextile provides protection against damage pursuant to ASTM D4873.

6.3.2 GEOTEXTILE CONFORMANCE TESTING

6.3.2.1 Tests

Upon delivery of the geotextile, the Geotechnical CQA Monitor shall ensure that samples are obtained and forwarded to an Independent Laboratory for testing of conformance with the design specifications. As a minimum, the following tests will be performed to ensure that geotextile materials are in conformance with the design specifications.

- Thickness (ASTM D1777)
- Mass per unit Area (ASTM D3776)
- Burst Strength (ASTM D3786)
- Puncture Strength (ASTM D4833)
- Permittivity (ASTM D4491)
- Grab Tensile Tests (ASTM D4632)
- Apparent Opening Size (ASTM D4751)
- Appropriate interface shear testing as noted of the Specifications

Where optional procedures are noted in the test method, the requirements of the Specifications shall prevail. Updated or alternative ASTM Test Methods may be used to determine the physical properties of the geotextile materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer on an appropriate form (Form B-11 attached).

6.3.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be three feet long by the roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturer's roll identification number.

Unless otherwise specified, samples shall be taken at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of samples.

6.3.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the geotextile material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the geotextile material can be accepted. If the second test fails, the Contractor/Liner Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.3.3 GEOTEXTILE INSTALLATION

6.3.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitors shall observe that:

- All lines and grades have been verified.
- The subgrade has been prepared in accordance with the Project Specifications and the supporting surface does not contain rocks or irregular surfaces which could damage the geotextile.
- There are no excessively soft areas which could result in damage to the geotextile.
- The Contractor/Liner Subcontractor has certified in writing that the surface on which the geotextile will be installed is acceptable.

6.3.3.2 Placement

The Contractor/Subcontractor shall give each geotextile panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports, and panel numbers on an appropriate form (Form B-12 attached).

During panel placement, the Geotechnical CQA Monitor shall:

- Observe the geotextile as it is placed and record all defects and disposition of the defects (panel rejected, patch installed, etc.). All repairs are to be made in accordance with the Specifications.

- Observe that equipment used does not damage the geotextile by handling, traffic, leakage of hydrocarbons, or other means;

- Observe that people working during installation of geotextile do not smoke, wear shoes that could damage the geotextile, or engage in other activities that could damage the geotextile

- Observe that the geotextile is anchored to prevent movement by the wind.

- Observe that adjacent panels of geotextile are overlapped a minimum of 18 inches where the fabric is not seamed (welded or sewn). When seamed, a three inch minimum overlap will be required.

The Geotechnical CQA Monitors shall inform both the Contractor/Liner Subcontractor and the Geotechnical CQA Officer if the above minimum conditions are not met.

The Contractor/Liner Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No geotextile shall be placed until the panel layout plan has been approved by the Construction Manager. During geotextile placement, the Geotechnical CQA Monitors shall observe that:

- The geotextile is cut only with an approved geotextile cutter, and is not torn or ripped.

- The thread and sewing machinery meet the Project requirements (if sewing is the elected method of joining panels).

- The panels are being overlapped or joined in accordance with the Project Plans and Specifications.

- Any roll of geotextile with a tear exceeding 10 percent of roll width is removed and replaced.

6.3.4 REPAIRS

Any necessary repairs to the geotextile shall be made with the geotextile material itself, using approved overlaps or sewing systems, equipment and techniques. The patch size shall be 18 inches or larger in all directions than the area to be patched and all corners shall be rounded.

6.4 GEOCOMPOSITE

The Contractor/Liner Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet which includes all specified properties measured using test methods indicated in the specifications.
- A description of the sampling procedure and appropriate test results.
- A certification that values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet or exceed the project specifications.
- The measurement of properties by the Liner Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geocomposite. The quality control certificate shall be signed by a responsible person employed by the Liner Manufacturer, and shall include roll number and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the project specifications.

6.4.1 GEOCOMPOSITE DELIVERY

The Contractor/Liner Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of geocomposite material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the geocomposite.
- Care is used to unload the rolls.
- All documentation required by the Specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitors shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitors shall indicate to the Geotechnical CQA Officer any

rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws.

Any damaged rolls shall be marked as rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the manufacturer shall also be stored at a separate location until all documentation has been received and approved. A log of the geocomposite material(s) received shall be maintained by the Geotechnical CQA Monitors.

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the material is not stored directly on the ground and that storage of the geocomposite provides protection against damage pursuant to ASTM D4873.

6.4.2 GEOCOMPOSITE CONFORMANCE TESTING

6.4.2.1 Tests

Upon delivery of the geocomposite, the Geotechnical CQA Monitor shall ensure that samples are obtained and forwarded to a GAI certified Independent Laboratory for testing of conformance with the design specifications. Conformance sampling and testing will be conducted in accordance with Section D of the Project Specifications.

- Thickness (ASTM D1777)
- Mass per unit area (ASTM D3776)
- Hydraulic Transmissivity (ASTM D4716
- Carbon Black Content (ASTM D1603)
- Tensile Strength (machine direction; ASTM D1682)

Where optional procedures are noted in the test method, the requirements of the Specifications shall prevail. Updated or alternative ASTM Test Methods may be used to determine the physical properties of the geocomposite materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer.

6.4.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be three feet long by the

roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturer's roll identification number.

Unless otherwise specified, samples shall be taken at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of samples.

6.4.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the geocomposite material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the geotextile material can be accepted. If the second test fails, the Contractor/Liner Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.4.3 GEOCOMPOSITE INSTALLATION

6.4.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitors shall observe that:

- All lines and grades have been verified.
- The subgrade has been prepared in accordance with the Project Specifications and the supporting surface does not contain rocks or irregular surfaces which could damage the geocomposite.
- There are no excessively soft areas which could result in damage to the geocomposite.
- All construction stakes and hubs have been removed.
- The Contractor/Liner Subcontractor has certified in writing that the surface on which the geocomposite will be installed is acceptable.

6.4.3.2 Placement

The Contractor/Subcontractor shall give each geocomposite panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports, and panel numbers.

During panel placement, the Geotechnical CQA Monitor shall:

- Observe the geocomposite as it is placed and record all defects and disposition of the defects (panel rejected, patch installed, etc.). All repairs are to be made in accordance with the Specifications.
- Observe that equipment used does not damage the geocomposite by handling, traffic, leakage of hydrocarbons, or other means.
- Observe that people working during installation of geocomposite do not smoke, wear shoes that could damage the geocomposite, or engage in other activities that could damage the geocomposite.
- Observe that the geocomposite is anchored to prevent movement by the wind.
- Observe that adjacent panels of geocomposite are overlapped a minimum of 18 inches where the fabric is not seamed (welded or sewn). When seamed, a three inch minimum overlap will be required.

The Geotechnical CQA Monitors shall inform both the Contractor/Liner Subcontractor and the Geotechnical CQA Officer if the above minimum conditions are not met.

The Contractor/Liner Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No geocomposite shall be placed until the panel layout plan has been approved by the Construction Manager. During geocomposite placement, the Geotechnical CQA Monitors shall observe that:

- The geocomposite is cut only with an approved cutter, and is not torn or ripped.
- Geocomposite seaming equipment meet the Project requirements.
- The panels are being overlapped or joined in accordance with the Project Plans and Specifications.
- Any damaged roll of geocomposite is removed and replaced.

6.4.4 REPAIRS

Any necessary repairs to the geocomposite shall be made with the geocomposite material itself, using approved overlaps or seaming systems, equipment, and techniques. The patch size shall be 18 inches or larger in all directions than the area to be patched and all corners shall be rounded.

7.0 DOCUMENTATION

The Geotechnical CQA Plan depends on thorough monitoring and documentation of all construction activities. Therefore, the Geotechnical CQA Officer shall document that all Geotechnical CQA requirements have been addressed and satisfied. Documentation shall consist of daily reports, construction problem reports, photographs, design and specification revisions, and a certification report.

7.1 DAILY SUMMARY REPORTS

Daily summary reports provide a chronological framework for identifying and recording all other reports and shall consist of field notes, summary of the daily meeting with the Contractor/Liner Subcontractor, observation and data sheets (including a record of field and/or laboratory tests) and construction corrective measures reports. This information shall be submitted daily to the Geotechnical CQA Officer for review and approval. The summary of the daily meeting with the Contractor/Liner Subcontractor shall include:

- Date, project name, and location.
- Names of parties attending.
- Scheduled activities.
- Items discussed.
- Signature of Geotechnical CQA Monitor.

The corrective measures report will include detailed descriptions of materials and/or workmanship that do not meet a specified design and will be cross referenced to the specific inspection data sheets where the problem was identified and corrected.

7.2 OBSERVATION AND TEST DATA REPORTS

Observation and test data reports shall include:

- Date, project name, and location.
- Weather data.
- A reduced scale site plan showing work areas, including sample and test locations.
- A description of ongoing construction.

- A summary of test results identified as passing, failing, or, in the event of a failed test, retest.
- Test equipment calibrations, if applicable.
- A summary of decisions regarding acceptance of the work and/or corrective actions taken.
- The signature of the Geotechnical CQA Monitor.

A summary of observation and test data reports shall be submitted on a schedule mutually agreeable to the Construction Manager and Geotechnical CQA Officer.

7.3 CONSTRUCTION CORRECTIVE MEASURES REPORTS

These reports identify and document construction problems and solutions. They are intended to document problems involving significant rework, and are not intended to document problems which are easily corrected unless the problems are recurring. Each report shall include:

- A detailed description of the problem.
- The location and cause of the problem
- The solution to the problem.
- The personnel involved.
- Signatures of the Geotechnical CQA Officer and Construction Manager.

7.4 DESIGN AND SPECIFICATION REVISIONS

Design and specification revisions may be required during construction. In such cases, the Geotechnical CQA Officer shall notify the Construction Manager. Design and specification revisions shall become official only after written approval of the Construction Manager.

7.5 PHOTOGRAPHS

Construction activities will be photographed, including significant problems and remedial actions. The photographs will be identified by location, time, date, and photographer.

7.6 AS-BUILT PLANS

As-built plans shall be prepared by the Contractor/Subcontractor from surveying and base maps prepared by a Registered Land Surveyor. The Geotechnical CQA Monitors shall observe that the "As-Built" plans include:

- Dimensions of all field panels;
- Location of each panel relative to the surveyor's plan;
- Identification of all panels and seams (including manufacturer's roll identification numbers);
- Location of all patches and repairs;
- Location of all nondestructive and destructive test sampling;
- Identification of problems or unusual conditions.

7.7 FINAL CERTIFICATION REPORT

At completion of the work, the Geotechnical CQA Officer shall prepare and submit a final certification report. This report shall render an opinion as to whether the work was performed in compliance with the project plans and specifications.

As a minimum, the final certification report shall include:

- A summary of all construction activities;
- Laboratory and field test results;
- Observation and test data sheets;
- Sampling and testing location plans;
- A description of significant construction problems and the solutions of these problems;
- A list of revisions from the construction plans and specifications, and the justification for these revisions;
- A certification statement signed and sealed by a Civil Engineer or Certified Engineering Geologist registered in the State of California.

Upon completion of construction, the facility will store all original documents so that they are protected from damage throughout the post-closure maintenance period, yet can be readily accessed.

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Geologists, Hydrogeologists and Engineers

B-1
FML RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

18908

GeoLogic Associates
Geologists, Hydrogeologists and Engineers

B-1A
GCL RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

18909

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B-1B
GEOCOMPOSITE RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

18910

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B-2
FML CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
FML Specification																
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

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B-2A
GCL CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

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B-2B
GEOCOMPOSITE CONFORMANCE TEST

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PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

18913

B-4

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FML PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

18914

ACCEPTANCE OF SOIL SUBGRADE FOR THE SUPPORT OF GEOSYNTHETIC LINER (FML)

PROJECT NAME: GREGORY CANYON LANDFILL
COMPOSITE LINER SYSTEM CONSTRUCTION

LINER CONTRACTOR:
AREA APPROVED: _____

_____

_____

I, the undersigned, duly authorized representative of the LINER CONTRACTOR, accept the soil subgrade for the support of the geosynthetic liner in the aforementioned area. I shall be responsible for maintaining its integrity and suitability, in accordance with the project specifications from this date to completion of the installation in this area. I do not accept any responsibility for the conditions or character of the subsurface soil.

NAME (PRINT)	SIGNATURE	TITLE	DATE

ACKNOWLEDGED BY QA MONITOR

NAME (PRINT)	SIGNATURE	COMPANY/TITLE	DATE

B-4A

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GCL PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

18916

B-4B

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GEOCOMPOSITE PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

18917

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B-5
FML PANEL PLACEMENT LOG

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

CAP REPAIRED TESTED CHK'D BY: _____

PATCH REPAIRED TESTED EXTRUDATE REPAIRED TESTED

DATE:	TIME:	REMARKS
QA MONITOR:	AMB:	
PANEL #	ROLL #	

B-6
FML SEAM TRIAL WELDS

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PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Sample Number (Daily)	Date Completed	Welder Number	Technician	Time (AM/PM)	Temperature				Test Results						Remarks
					Ambient	Wedge	Extrudate	Preheat	Peel FTB	Strength (lbs/in)	Shear FTB	Strength (lbs/in)	Mils	QA Monitor	

18919

B-7

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FML SEAMING LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Seam Number	Date Seamed	Seam Length feet	Equipment Number	Tech	Time Seamed	Wind Speed m.p.h.	Temperature		Non-Destructive Tests				Repairs			Destructive Sample				Status I/P/F/A
							Sheet Deg. F	Amb Deg. F	Probe/ VI	VT.	ST.	AP.	Yes/No	Date Repaired	Date Tested	Sample Number	P/F	Date Repaired	Date Tested	

NOTES:

VT –Vaccum Test
ST –Spark Test
AP–Air Pressure Test
VI –Visual Inspection

STATUS:

I –In Progress
P –Pass
F –Fail
A –As built In

Checked By:_____

Seam Length:

This page_____

Total previous page(s)_____

Grand Total:_____

B-8

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FML DESTRUCTIVE TEST SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Sample Number	Seam Type (wedge/ extrusion)	Date Seamed	Equipment Number	Tech	Seam Number	Ambient Temperature (Deg. F) at time seamed	Bonded Seam Strength		P/F	Seam Peel Adhesion		P/F	Remarks
							FTB	Strength (lbs./inch)		FTB/ (FTB+Peel)	Adhesion (lbs./inch)		

Type:

FTB – Film Tear Bond

Notes:

Checked By:

18921

B-9
FML SEAMING LOG SUMMARY

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PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.				Sheet	Amb	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		
								am/pm	m.p.h.	Deg. F	Deg. F													

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.				Sheet	Amb	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		
								am/pm	m.p.h.	Deg. F	Deg. F													

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.				Sheet	Amb	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		
								am/pm	m.p.h.	Deg. F	Deg. F													

* – Note what type of test was used:

VT –Vaccum Test
ST –Spark Test
AP –Air Pressure Test

STATUS:

I –In Progress
P –Pass
F –Fail
A –As built In

SEAM TYPE:

EW –Extrusion Weld Seam
WW –Wedge Weld Seam

Checked By: ____________________

Seam Length (this page): __________

Total (previous pages): __________

Grand Total: __________

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B-10
GEOTEXTILE RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot/Batch Number	AREA				CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumulative Sq. Ft. Rcvd.					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

18923

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B-11
GEOTEXTILE CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq. ft.	Status I/P/F	Remarks
Specification																
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

B-12

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GEOTEXTILE PLACEMENT LOG

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS			Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Ft.	Yes/No	Date Repaired	Date Tested		

Manufacturer:
Type:

Notes:

Checked By:

18925

Institute of
Waste Management
of Southern Africa

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS

Riva Nortjé MScEng (Civil) PrEng
Associate, Waste & Tailings

Jones & Wagener
Engineering & Environmental Consultants

Keep in Mind…

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There are known knowns. These are things we know that we know.

There are known unknowns. That is to say, there are things that we know we don't know.

But there are also unknown unknowns. There are things we don't know we don't know.

Donald Rumsfeld

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What is liner leakage?

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18928

- Flow that occurs through a lining system.
- No leakage is a great objective, but is not usually realistically achievable.

Why are leakage rates important?

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Leakage rates are:

- Used in groundwater models undertaken for risk assessments/ analyses to determine possible and likely impacts from new facilities.
- Used in groundwater models to determine likely impact of possible mitigation measures for existing and for new facilities.
- Used to design drainage elements.

Monitoring and interpreting leakage rates can indicate when a problem has occurred and this can be mitigated before it impacts the environment significantly.

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Grasping Leakage Rates

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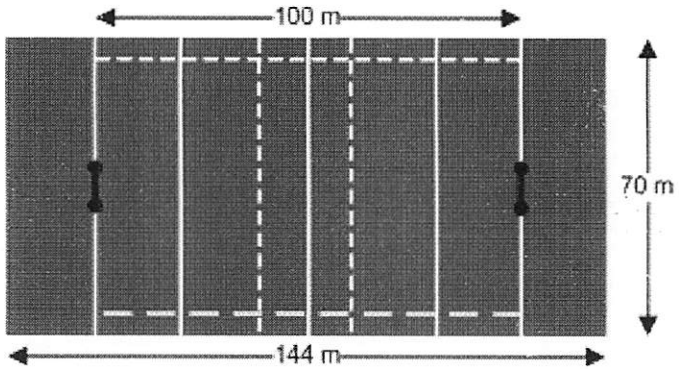
18930

How big is a hectare?

Rugby (International size: 1.008 ha)



How much does a bucket hold?

10 litres

Leakage rate of 10 litres per hectare per day is equivalent to emptying a bucket of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Grasping Leakage Rates

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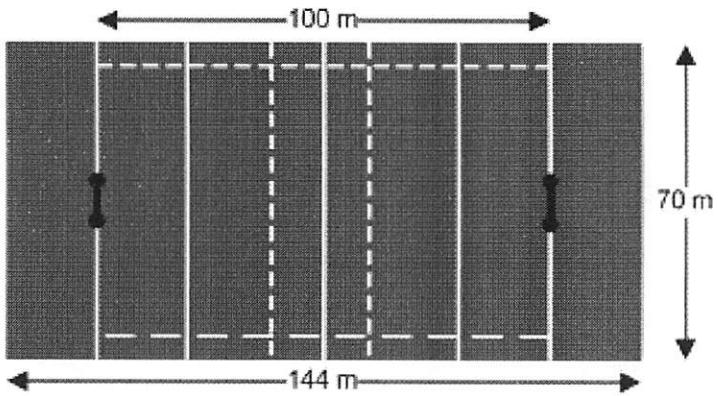
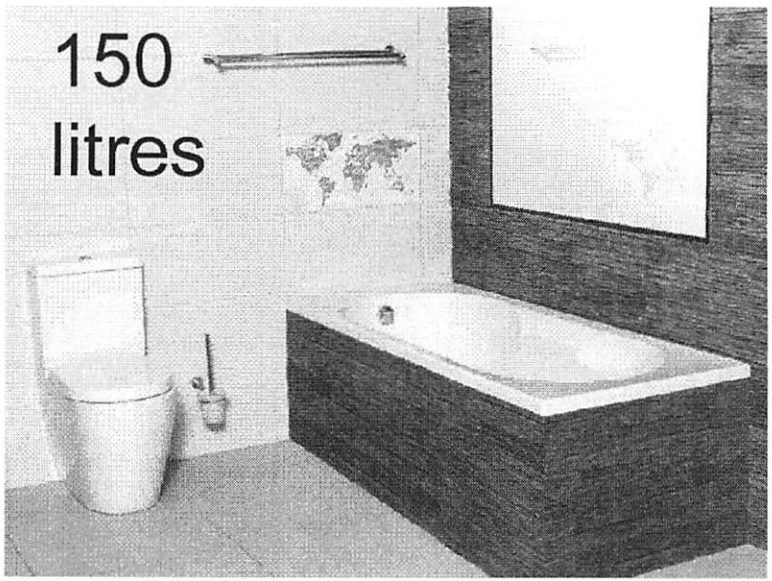
18931

How big is a hectare?

Rugby (International size: 1.008 ha)



How many litres does a bath hold?



Leakage rate of 150 litres per hectare per day is equivalent to emptying a bath full of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Grasping Leakage Rates

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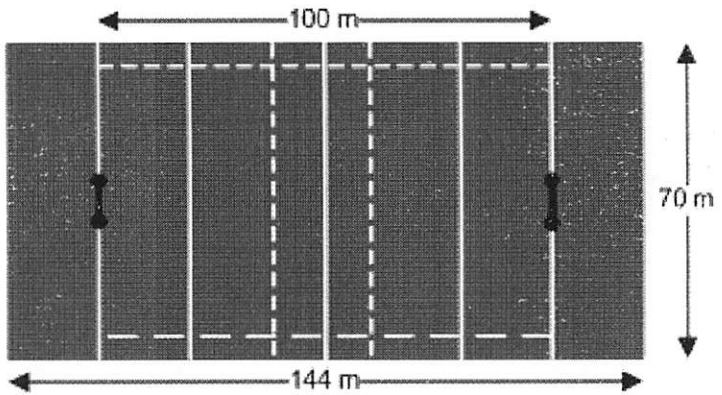
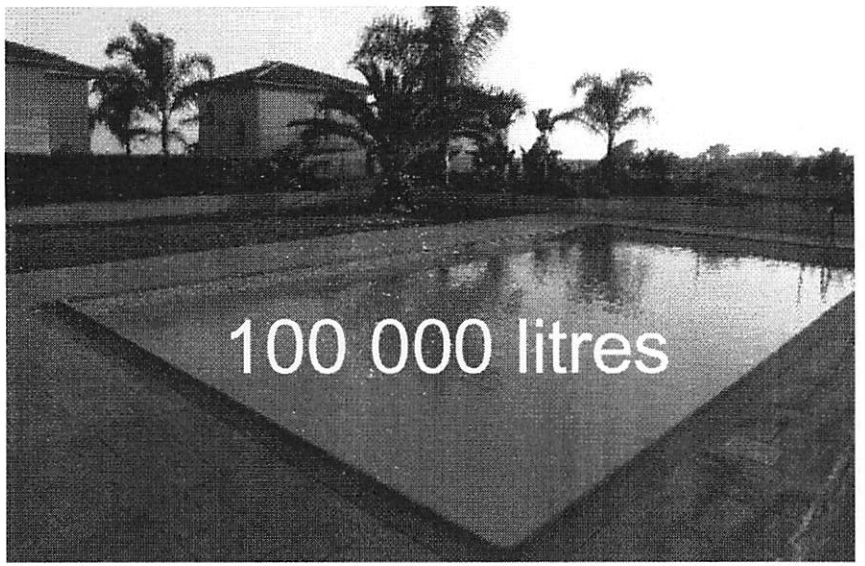
18932

How big is a hectare?

Rugby (International size: 1.008 ha)



How many litres does a big pool hold?



Leakage rate of 100 000 litres per hectare per day is equivalent to emptying a big pool full of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Barrier Systems: Norms and Standards (2013)

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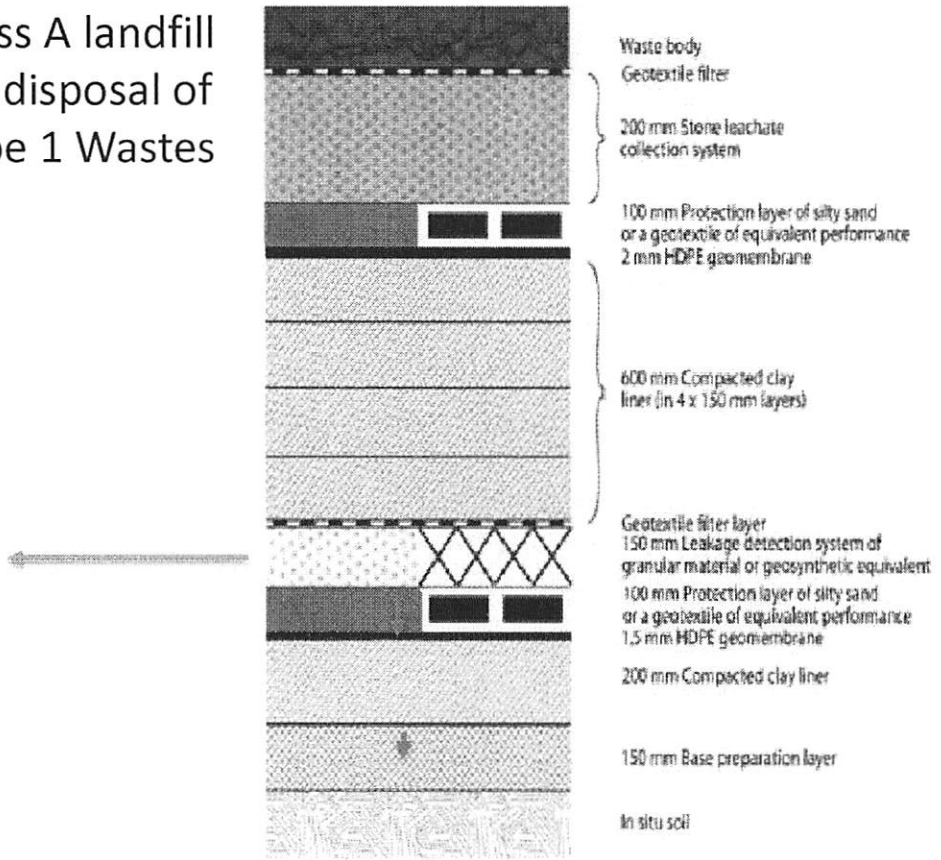
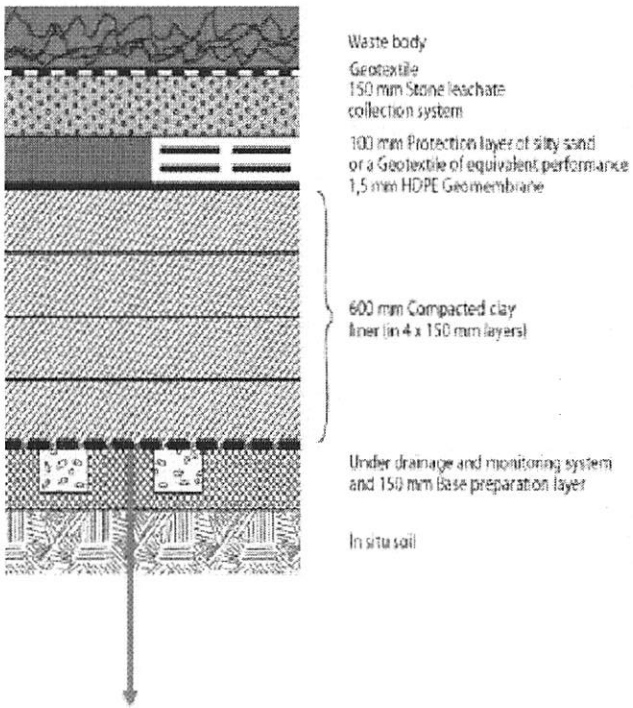
Class A landfill for disposal of Type 1 Wastes



Class B landfill for disposal of Type 2 Wastes



Department of Environmental Affairs, 2013. National Norms and Standards for Disposal of Waste to Landfill, No. R. 636, Government Gazette No. 36784.

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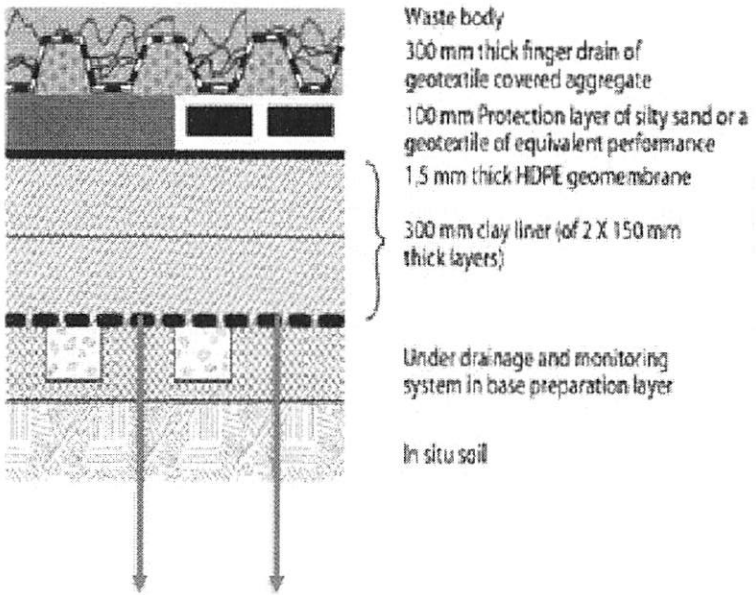
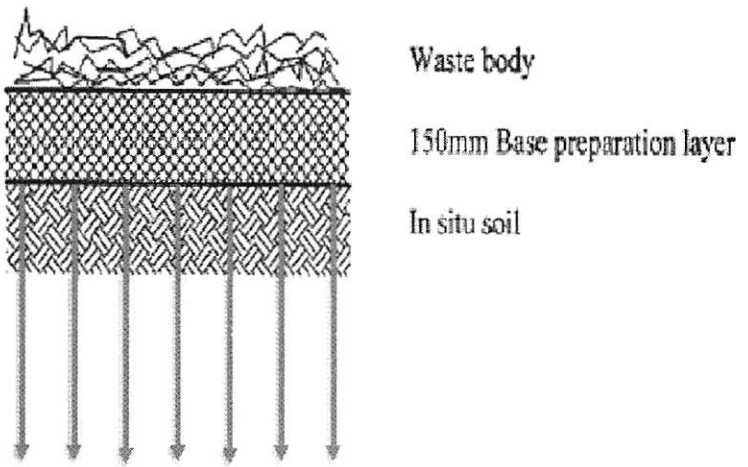
Barrier Systems: Norms and Standards (2013)

Institute of Waste Management of Southern Africa

Class C landfill for disposal of Type 3 Wastes



Class D landfill for disposal of Type 4 Wastes



Department of Environmental Affairs, 2013. National Norms and Standards for Disposal of Waste to Landfill, No. R. 636, Government Gazette No. 36784.

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HOW NOT TO ESTIMATE LEAKAGE RATES

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1. Obtain facility information

2. Undertake minimal liner design

3A. Calculate likely range of leakage for minimum liner design from old literature, don't consider chemical compatibility, assume materials, construction etc will be ideal etc

3B. OR Pull out some composite liner leakage rates from overseas literature, where design and CQA requirements are strict

4. Use the low leakage rates chosen in the *RISK ANALYSIS* without stating assumptions

5. Get approval and file it

6. Don't include assumptions made regarding materials, construction, protection, operation and rehabilitation into subsequent documentation (design, tenders, construction quality plans, operating manuals etc)

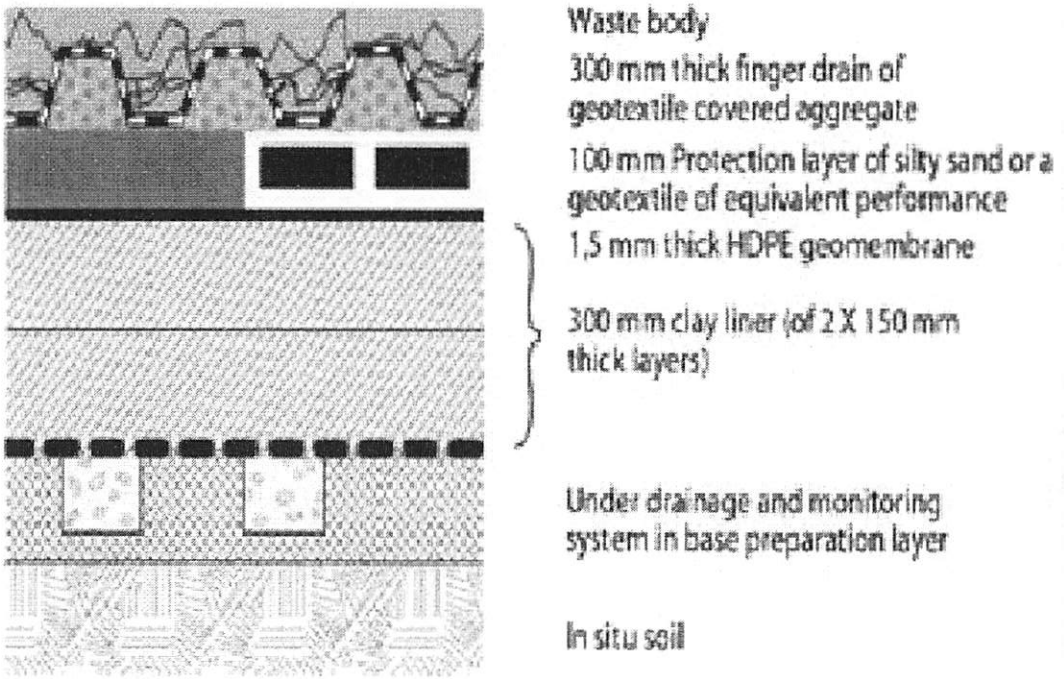
7. Don't appoint specialists to construct liners

8. Don't undertake construction quality assurance

9. Don't monitor leakage rates nor compare with assumptions used in *RISK ANALYSIS*

Theoretical Example 1

- Large, wet tailings facility proposed.
- Assume a Class C liner from the National Norms and Standards:



Theoretical Example 1

- That's a composite liner, and we'll get good contact between the geomembrane and the clay, with maybe only a few small holes, and our finger drains will keep the liquid height on top of the liner at not more than 300mm, right?
- Pull leakage rates from Giroud (1989):

Table 1 - Generalized Leakage Rates Through Liners
(ref. Giroud and Bonaparte, Jour. G & G, 1989)

Type of Liner	Leakage Mechanism	Liquid height on top of the geomembrane			
		0.03 m	0.3 m	3 m	30 m
Geomembrane alone (between two sand layers)	Diffusion	0.01	1	10	300
	Small Holes*	300	1,000	3,000	10,000
	Large Holes*	10,000	30,000	100,000	300,000
Composite liner (poor field conditions, i.e., waves)	Diffusion	0.01	1	100	300
	Small Holes*	0.8	6	50	400
	Large Holes*	1	7	60	500
Composite liner (good field conditions, i.e., flat)	Diffusion	0.01	1	100	300
	Small Holes*	0.15	1	9	75
	Large Holes*	0.2	1.5	11	85
		Values of leakage rate are in lphd (values can be divided by approximately 10 to obtain values expressed in gpad)			

*assumes 3 holes/ha (i.e., 1.0 hole/acre)

Theoretical Example 1 continued

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- Use a leakage rate of 2 l/ha/day into your risk analysis for the whole facility, pollution control dam included.
- Risk analysis shows no significant impacts.
- Great! Recommend Class C liner.

BUT:

- The literature you've used is from 1989, and parts have been superceded.
- You haven't checked the assumptions made in the 1989 paper. (USA typically requires clay liners of 1m thick, constructed in layers with permeability of minimum 1 x 10^{-7}cm/s, and construction quality assurance (CQA) on site, and chemical compatibility testing, etc etc).

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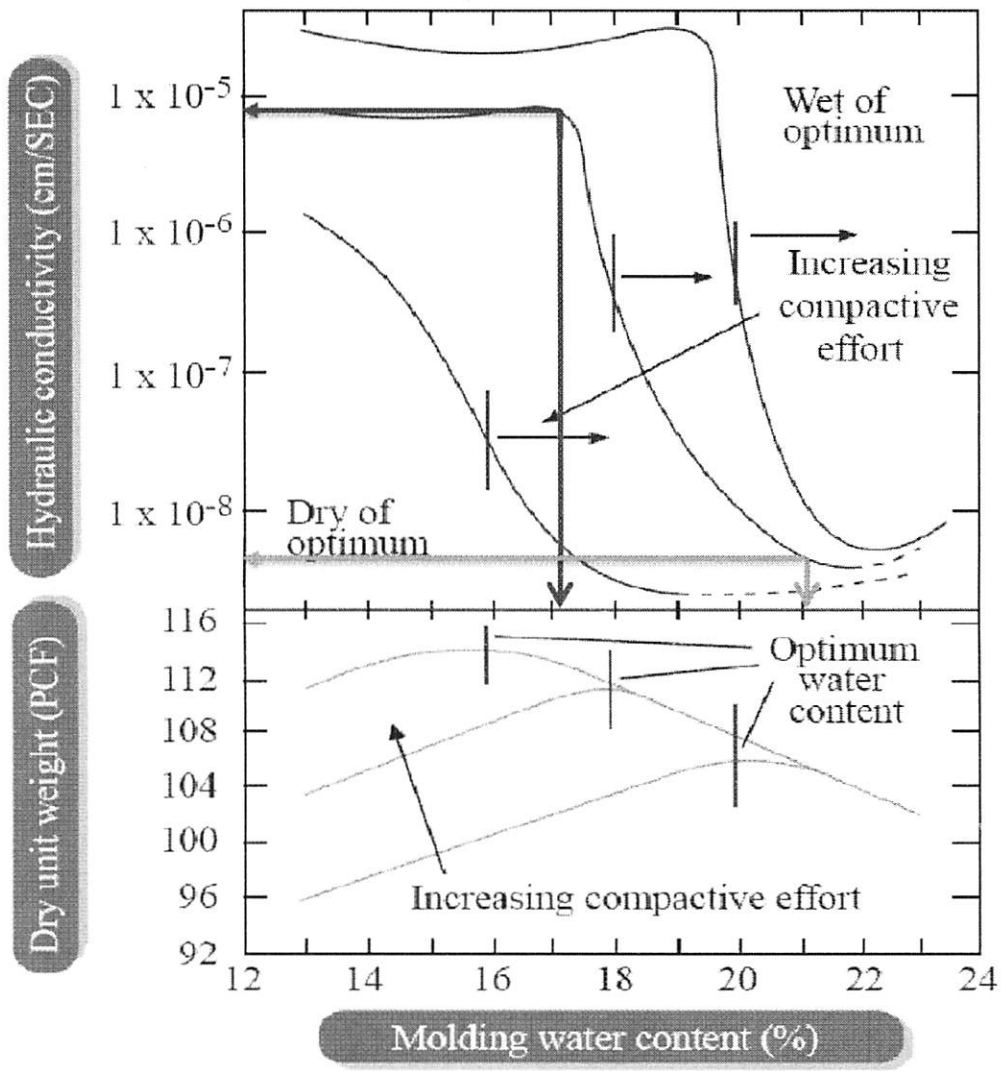
Theoretical Example 1 continued

AND:

You haven't taken into account that the Class C liner design is for a waste site generally with limited liquid input and output, and finger drains are not likely to drain wet tailings sufficiently, plus you have a pollution control dam with a much higher liquid head.

THEN:

The Contractor doesn't really understand the objectives. He messes up the selection from borrow, doesn't control moisture content of the clay liner, builds 1 x 300mm layer instead of 2 x 150mm layers, and only uses a smooth roller for compaction. The "clay liner" contains large particles that can damage the overlying geomembrane.



Effect of molding water content and compactive energy on hydraulic conductivity.

Adapted from: Daniel, D. E. "Clay Liners." *Geotechnical Practice for Waste Disposal.* Edited by D. E. Daniel. New York: Chapman & Hall, 1993, pp. 137-163.

A difference of <8% moisture content of this soil at the time of compaction makes a difference of 1000 times to its permeability/ hydraulic conductivity using standard Proctor compaction.

<u>So if compacted too dry, the soil liner could let 1000 times more seepage through than if its minimum permeability was achieved</u>.

Theoretical Example 1 continued

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AND:

- There isn't quality control or assurance on placement of the geomembrane, it's from a dodgy supplier, and is full of tiny pinholes and sub-standard welds.
- There is no wrinkle control on site, and the geomembrane is really wrinkled when it's time to cover it. Black plastic in Africa?
- It's really hard putting a 100mm sand layer over a geomembrane! No-one is checking that the sand doesn't contain large particles that could damage the geomembrane, big trucks and plant are used, and these nick the top of the geomembrane wrinkles.

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Liner wrinkling

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Fig. 11. Photograph of wrinkles at QUELTS (same bottom liner as shown in Fig. 8) on 23 March 2007 when ambient temperature was 9 °C. Note longitudinal wrinkles at 3.3 m spacing are beginning to form. White patches are what remain of a sprinkling of snow on liner from the previous night. Water puddles from melting snow are constrained from flowing off the base (slope 3% from left to right — north to south) by the wrinkles.

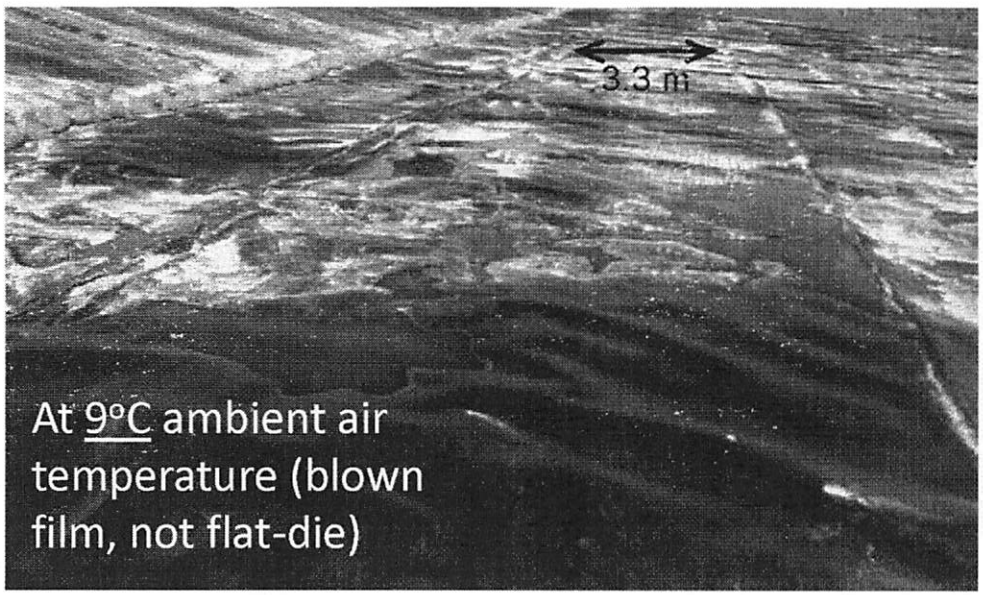
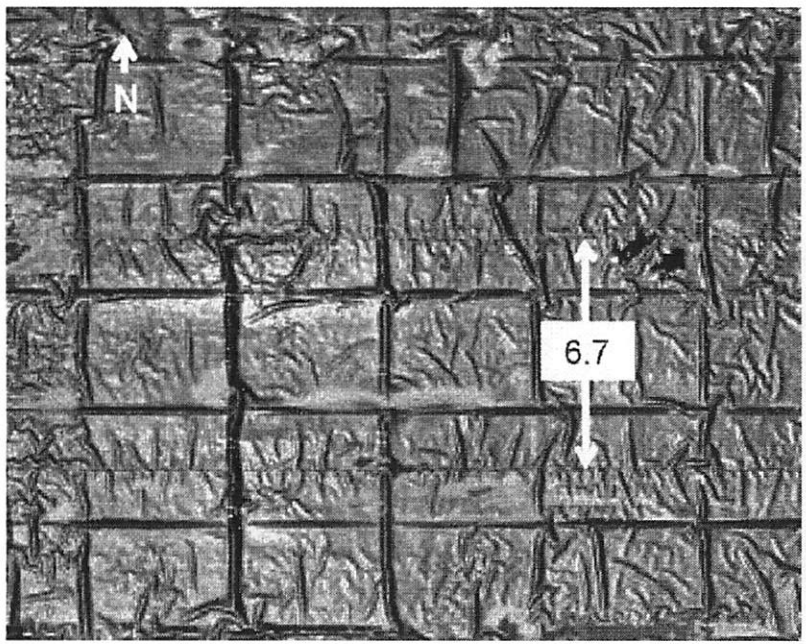


Fig. 12. Aerial photo showing a small portion of connected wrinkle network on the base liner at QUELTS (same bottom liner as shown in Figs. 8 and 11) (modified from Rowe et al.[2]). Photo taken on 28 May 2008 at 1300; air temperature of 11 °C; GM temperature on the base of 53 °C. Distance between GM seams is approximately 6.7 m as shown.



At 11°C ambient air temperature

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

Theoretical Example 1 continued

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PROBLEMS:

- The geomembrane line is riddled with pinholes, and has tears along the top of the wrinkles, and some gaps in the welds. This allows a lot of flow through to the "clay liner" below, especially as the wrinkles are linked.
- Because the clay liner wasn't constructed properly, the permeability is now 1 x 10^{-5}cm/s instead of 1 x 10^{-7}cm/s (i.e. 100 times more permeable).
- There isn't good contact between the "clay" and the geomembrane, so they don't work as a composite liner.
- The liquid head on the liner rapidly builds up on the liner as the above liner finger drains can't cope, and easily reaches 15m with time.
- The leakage value used in the Risk Analysis wasn't accurate to start with.

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Theoretical Example 1 continued

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RESULT:

- The actual leakage rate is more than 10 000 times the value used in the risk analysis, and major ground water pollution occurs as a result.
- The vast majority of the leakage from the tailings dam isn't collected, because there are only finger drains below the "lining system". (The finger drains weren't designed to handle such high flows anyway.)
- Because fairly low leakage rates were picked up in the underperforming underliner finger drains, no-one questioned if the liners were working until pollution of groundwater has occurred.
- The client has wasted the money they did spend on liners, as these have made very little difference.

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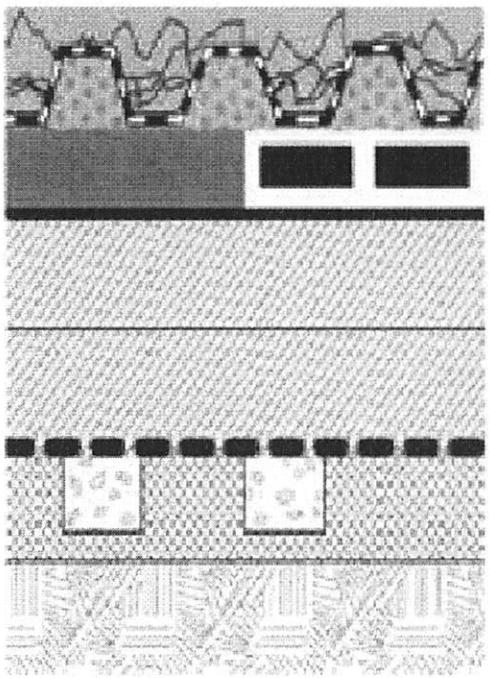
Theoretical Example 2

- Large, wet tailings facility proposed.
- Assume a Class C liner from the National Norms and Standards:



Waste body

300 mm thick finger drain of geotextile covered aggregate

100 mm Protection layer of silty sand or a geotextile of equivalent performance

1,5 mm thick HDPE geomembrane

300 mm clay liner (of 2 X 150 mm thick layers)

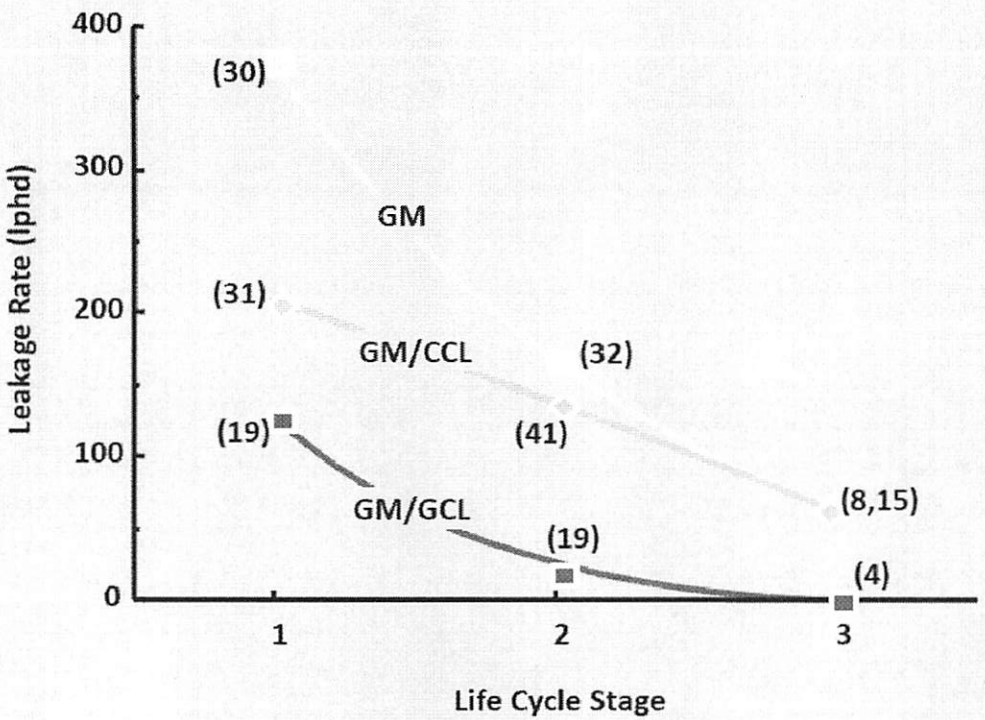
Under drainage and monitoring system in base preparation layer

In situ soil

Theoretical Example2

- Have a look at some literature – find some historical leakage results.

Average Values of Leakage Quantities
(ref. EPA CR-821448-01-0, 2002)



Bonaparte, R., Daniel, D.E and Koerner, R.M., 2002. Assessment and Recommendations for Improving the Performance of Waste Containment Systems. Report EPA/600/R-02/099, United States of America

Theoretical Example 2 continued

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- WOW – look at how low those geomembrane/ geosynthetic clay liner (GM/GCL) average leakage rates are compared to the geomembrane/ compacted clay liner (GM/CCL) ones – let's use a GCL!
- Use a leakage rate of 35 l/ha/day in your risk analysis for the whole facility, pollution control dam included.
- Risk analysis shows no significant impacts.
- Great! Recommend a Class C liner with a GCL replacing the CCL.

BUT:

- You haven't checked the assumptions made in the 2002 study. (These are landfills, not wet tailings facilities, and the US requires CQA on site, chemical compatibility testing, etc etc etc).

Theoretical Example 2 continued

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AND:

- You haven't considered chemical compatibility between the expected seepage from the tailings dam and the GCL, or the quality of the underlying soil pore water, or any likelihood of high head on the liner.

THEN:

- There is quality control on site, but the specification doesn't address wrinkle control of the geomembrane. So there is no wrinkle control on site, and the geomembrane is really wrinkled when it's time to cover it.

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Theoretical Example 2 continued

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THEN:

- Again, it's really hard putting a 100mm sand layer over a geomembrane! Big plant is used, and machines nick the top of the geomembrane wrinkles.

PROBLEMS:

- There are some tears along the top of the wrinkles, which allow a lot of flow through to the GCL below, especially as the wrinkles are linked.
- Cation exchange occurs in the GCL: the sodium ions are replaced with calcium (or other) cations in the sodium bentonite. The GCL may now be up to 1 000 times or even 10 000 times more permeable than it was to start with.

Theoretical Example 2 continued

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PROBLEMS:

- The liquid head on the liner rapidly builds up on the liner as the above liner finger drains can't cope, and easily reaches 15m with time.
- The leakage value used in the Risk Analysis wasn't accurate to start with for this case.

RESULT:

- The vast majority of the leakage from the tailings dam isn't collected, because there are only finger drains below the lining system. (The finger drains weren't designed to handle such high flows anyway.)

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Theoretical Example 2 continued

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RESULT:

- The actual leakage rate is 1 000 or so times the value used in the risk analysis, and major ground water pollution occurs as a result.
- Because fairly low leakage rates were picked up in the underperforming underliner finger drains, no-one questioned if the liners were working until groundwater pollution occurred.
- The client has wasted the money they did spend on liners that have made very little difference.

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So what can we learn from this?

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- You need to use recent literature for liner leakage equations.
- Not all liners are the same.
- Don't use leakage rates from studies from countries with higher design specs and strict CQA requirements unless you plan on meeting those specs and requirements.
- The leakage rate range used in risk analyses should be calculated by specialists who understand what affects liner performance – head on liners, chemical compatibility, material specifications, construction specifications, construction quality assurance, operational risks and requirements, rehabilitation risks and requirements, etc etc.
- Assumptions must be carried through to the design, material specifications, construction, operation and rehab phases.
- Calculate leakage rates for dams separately.

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HOW TO ESTIMATE LEAKAGE RATES

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1. Obtain facility information including size, chemistry and moisture content of residue, seepage info, climate, geotech etc

2. Consider whether comparable existing facilities are polluting

3. Theoretical liner design

4. Calculate likely range of leakage for theoretical liner design from formulae in recent literature, considering chemical compatibility etc

5. Cross-check with values in literature if comparable

6. Determine if impacts from the leakage range calculated would be acceptable or not *(RISK ANALYSIS)*

NO? Go back to Step 3.

YES!

7. State all assumptions regarding materials, construction, protection, operation and rehabilitation clearly

8. Ensure that all assumptions regarding materials, construction, protection, operation and rehabilitation are carried into subsequent document and are met

9. Compare measured leakage rates to estimated range

10. Monitor impacts, and mitigate where necessary

Other suggestions

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- This needs to be multi-disciplinary and consultative.
- There may well need to be iterations.
- Rather than have a competent person who isn't an engineer with experience and competence in liners recommend a barrier system from the risk analysis, a maximum leakage rate to environment should be recommended.
- The design, material sourcing, construction operation and rehabilitation should then aim to maintain leakage rates below the maximum specified through the life cycle of the facility.

Calculating liner leakage rates

Table 1 - Generalized Leakage Rates Through Liners
(ref. Giroud and Bonaparte, Jour. G & G, 1989)

1989!

Type of Liner	Leakage Mechanism	Liquid height on top of the geomembrane			
		0.03 m	0.3 m	3 m	30 m
Geomembrane alone (between two sand layers)	Diffusion	0.01	1	10	300
	Small Holes*	300	1,000	3,000	10,000
	Large Holes*	10,000	30,000	100,000	300,000
Composite liner (poor field conditions, i.e., waves)	Diffusion	0.01	1	100	300
	Small Holes*	0.8	6	50	400
	Large Holes*	1	7	60	500
Composite liner (good field conditions, i.e., flat)	Diffusion	0.01	1	100	300
	Small Holes*	0.15	1	9	75
	Large Holes*	0.2	1.5	11	85
		Values of leakage rate are in lphd (values can be divided by approximately 10 to obtain values expressed in gpad)			

*assumes 3 holes/ha (i.e., 1.0 hole/acre)

These formulae don't take account of geomembrane wrinkles.
Beware - some modelling programmes use these formulae.

Giroud, J.P. and Bonaparte, R. (1989). Leakage through Liners Constructed with Geomembranes – Part I. Geomembrane Liners. Part II. Composite Liners Geotextiles and Geomembranes, Vol. 8 No's 1&2.

Calculation developments

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- Rowe and Booker (1998) developed formulae that included transmittivity effects between a geomembrane and underlying clay/GCL, and took the thickness of the clay layer into account, and wrinkles.

Rowe, R.K. and Booker, J.R. (1998). Theoretical Solutions for Calculating Leakage through Composite Liner Systems. Geotechnical Research Centre Report GEOT-18-98.

Theoretical versus actual leakage rates

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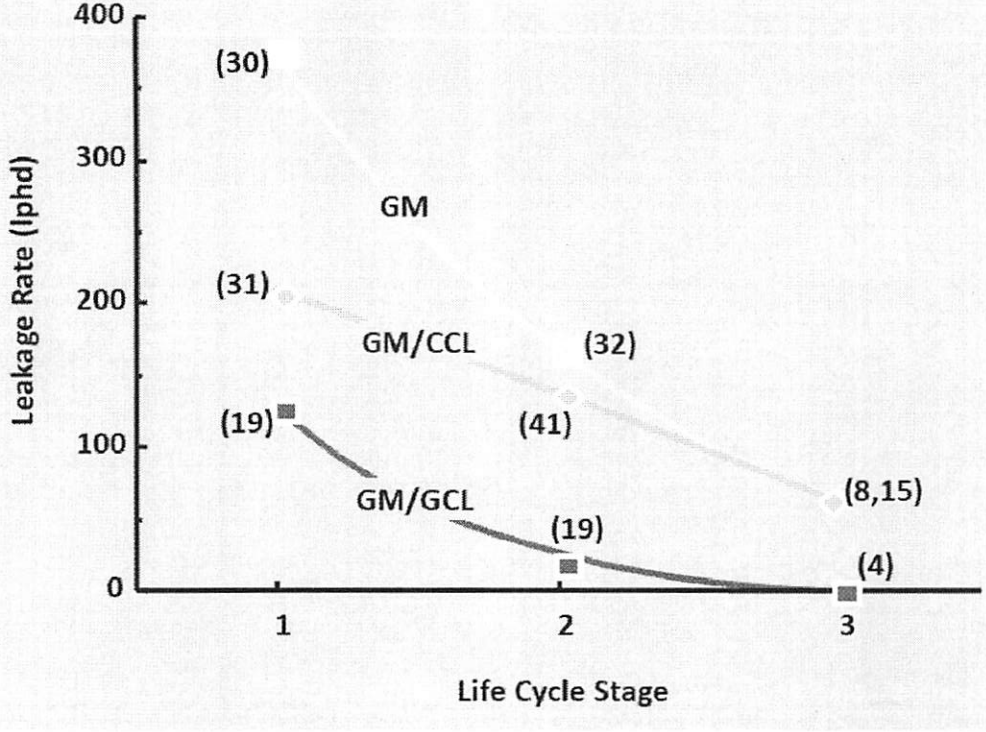
- EPA noted that there were big discrepancies between theoretical and measured leakage rates.

Average Values of Leakage Quantities
(ref. EPA CR-821448-01-0, 2002)



Bonaparte, R., Daniel, D.E and Koerner, R.M. (2002) Assessment and Recommendations for Improving the Performance of Waste Containment Systems. Report EPA/600/R-02/099, United States of America

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Calculation developments

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- Rowe (2005) again presented calculation of leakage through composite liners, taking linked, linear wrinkles into account.
- These calculations provide a much more realistic range for leakage from composite liners than 1989 calculations.

Rowe, R.K. (2005). Long-term performance of containment barrier systems. 4th Rankine Lecture. Géotechnique 55, No 9, pp 631-678.

Calculation developments

Institute of Waste Management of Southern Africa

- Rowe (2012) provides an excellent overview of the factors to be taken into account in determining short- and long-term leakage through composite liners.

KEY PAPER

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

From Rowe (2012)

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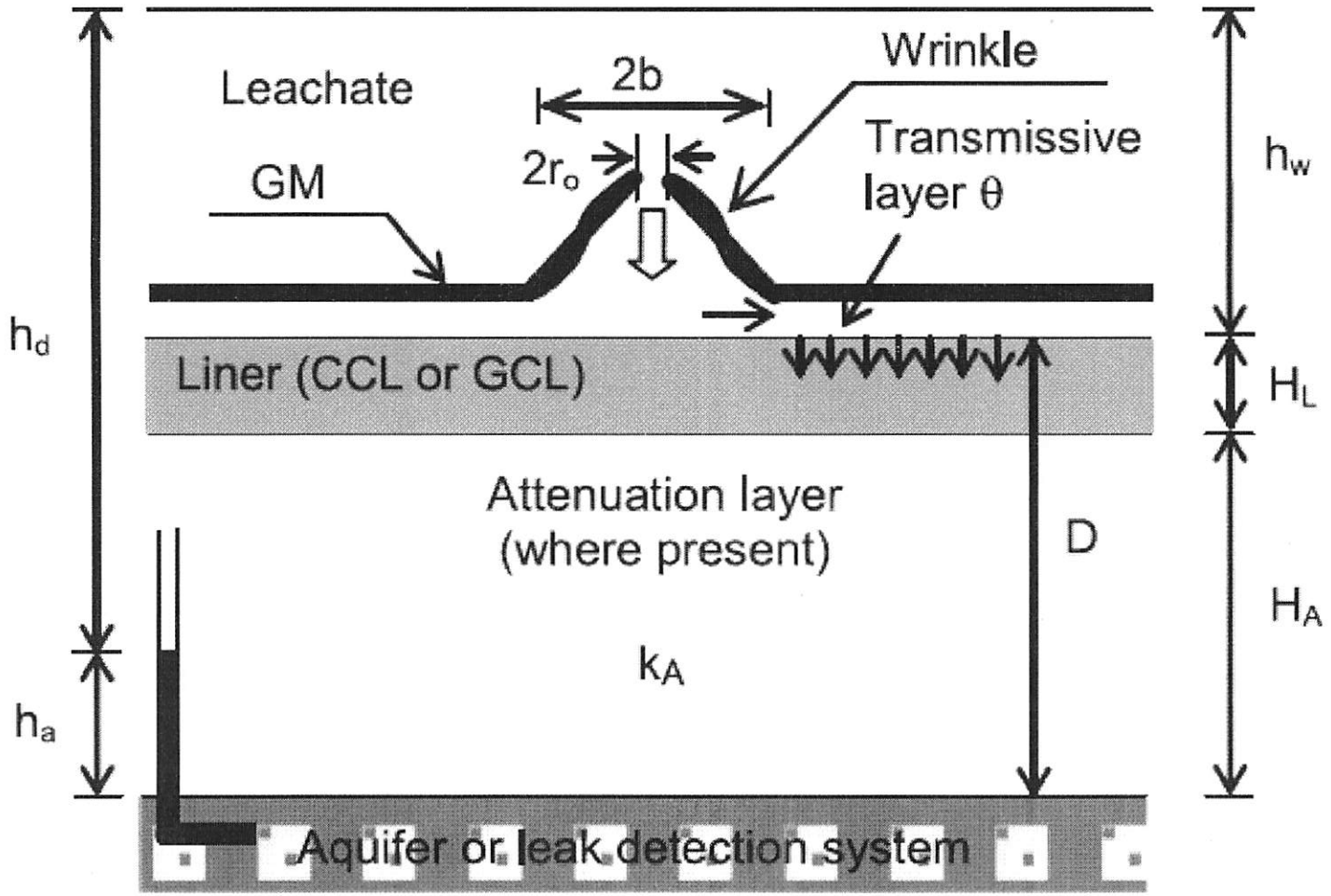
Fig. 10. Schematic showing leakage through a wrinkle of length L and width $2b$ with a hole of radius r_o (adapted from Rowe 1998).



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From Rowe (2012)

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Rowe (1998) had developed a simple equation to predict leakage through a hole in a GM coincident with (or adjacent to) a wrinkle (Fig. 10) which, in its simplest form (assuming no interaction between adjacent wrinkles), can be written:

$$[6] \qquad Q = 2L[kb + (kD\theta)^{0.5}]h_d/D$$

where Q is the leakage (m^3/s); L is the length of the connected wrinkle (m); k is either the hydraulic conductivity (m/s) of the clay liner, k_L, if there is no AL or the harmonic mean of the CL and AL hydraulic conductivities, k_s, if there is an AL; $2b$ is the width of the wrinkle (m); $D = H_L + H_A$ is the thickness of the CL and AL (m); θ is the transmissivity of the GM–CL interface (m^2/s); and $h_d = (h_w + H_L + H_A - h_a)$ is the head loss across the composite liner (m). All of these parameters except the connected wrinkle length and wrinkle width are as previously discussed. What is needed to use eq. [6] is an indication of the likely values of L and $2b$.

Class A Primary Liner: Tight control

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Controlling for small wrinkles

600mm CCL 2mm HDPE geomembrane composite Primary Liner

L	14	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	1.5		head loss across composite liner
Leakage	2.20387E-07	m3/s	Rowe (2012)
Leakage	19.04	litres per wrinkle per day	
Say you have 3 wrinkles with holes per hectare			
57.12	litres per hectare per day		

Class A Primary Liner: Less control

Institute of Waste Management of Southern Africa

Much bigger wrinkles

600mm CCL 2mm HDPE geomembrane composite Primary Liner

L	500	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	1.5		head loss across composite liner
Leakage	7.99597E-06	m3/s	Rowe (2012)
Leakage	690.85	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
6908.52	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with Compacted Clay Liner (CCL): Tight Control

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Class C Liner 300mm CCL 1.5mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	0.00000001	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.3	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	2		head loss across composite liner
Leakage	1.47993E-06	m3/s	Rowe (2012)
Leakage	127.87	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
639.33	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with CCL: Less Control

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Class C Liner 300mm CCL 1.5mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	0.00000001	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.3	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	2		head loss across composite liner
Leakage	5.95214E-05	m3/s	Rowe (2012)
Leakage	5142.65	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
25713.23	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with GCL: Tight Control: No cation exchange or erosion of bentonite

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Class C Liner 10mm GCL 1.5mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	31		head loss across composite liner
Leakage	7.08486E-07	m3/s	Rowe (2012)
Leakage	61.21	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
306.07	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with GCL: Less Control: No cation exchange nor erosion of bentonite

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Class C Liner 10mm GCL 1.5mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	31		head loss across composite liner
Leakage	4.08031E-05	m3/s	Rowe (2012)
Leakage	3525.38	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
17626.92	litres per hectare per day – *liquid outputs could be limited by liquid inputs*		

Dam with CCL: Tight control

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Dam: 600mm CCL with 2mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	9.33		head loss across composite liner
Leakage	1.3713E-06	m3/s	Rowe (2012)
Leakage	118.48	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
592.40	litres per hectare per day		

Dam with CCL: Less control

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Dam: 600mm CCL with 2mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	9.33		head loss across composite liner
Leakage	4.89749E-05	m3/s	Rowe (2012)
Leakage	4231.43	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
21157.16	litres per hectare per day		

Dam with GCL: Tight control: No cation exchange: No erosion of bentonite

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	1.16557E-06	m3/s	Rowe (2012)
Leakage	100.71	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
503.53	litres per hectare per day		

Dam with GCL: Less control: No cation exchange: No erosion of bentonite

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Much bigger wrinkles

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	6.71276E-05	m3/s	Rowe (2012)
Leakage	5799.83	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
28999.13	litres per hectare per day		

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Dam with GCL: Less control: Cation exchange: No erosion of bentonite

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Fewer wrinkles, but with cation exchange

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	100	m	length of wrinkle
k	0.00000002	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	0.00414451	m3/s	Rowe (2012)
Leakage	358085.70	litres per wrinkle per day	
Say you have 2 wrinkles with holes per hectare			
716171.41	litres per hectare per day – *liquid outputs may be limited by emptying the dam*		

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Rowe (2012)

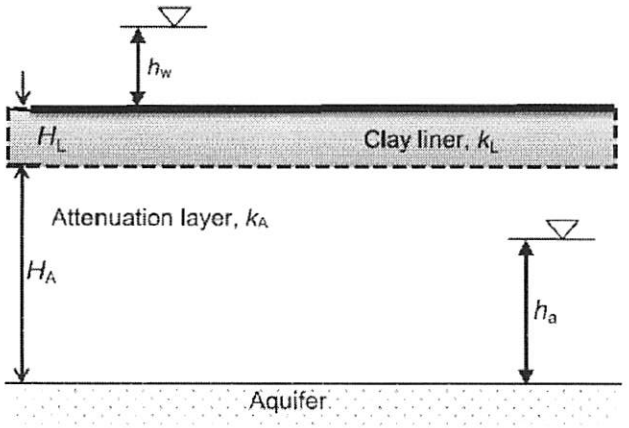

Table 12. Calculated leakage, Q, through selected composite liners for a hole in a connected wrinkle of length L for $h_w = 5$ m.

			Q (lphd)		
Case	k_L (m/s)	θ (m^2/s)	L = 100 m	L = 200 m	L = 700 m
CCL[a]	1×10^{-9}	1.6×10^{-8}	510	100	3600
	1×10^{-8}	1.0×10^{-7}	4100	8200	≥24 000
GCL[b]	5×10^{-11}	2×10^{-11}	70	140	490
	2×10^{-10}	2×10^{-11}	230	450	1600
	2×10^{-8}	2×10^{-11}	18 000	36 000	≥100 000
CCL[c]	1×10^{-9}	1.6×10^{-8}	510	1000	3600
	1×10^{-8}	1.0×10^{-7}	3400	6800	≥24 000
GCL[d]	5×10^{-11}	2×10^{-11}	70	140	490
	2×10^{-10}	2×10^{-11}	160	320	1100
	2×10^{-8}	2×10^{-11}	330	670	2300
GC–CC[e]	2×10^{-8}	2×10^{-11}	32	63	220

Note: Leakage calculated using eq. [6] and geometry as per schematic in Fig. 10 with $2b = 0.1$ m, hole $r_o = 5.6$ mm; calculated leakages have been rounded to two significant digits.

[a] $h_a = 0$ m, $H_L = 0.6$ m.

[b] $h_a = 0$ m, $H_L = 0.01$ m.

[c] $h_a = 3$ m, $H_L = 0.6$ m; $H_A + H_L = 3.75$ m.

[d] $h_a = 3$ m, $H_L = 0.01$ m; $H_A + H_L = 3.75$ m.

[e] 0.01 m GCL ($k_L = 2 \times 10^{-8}$ m/s) + 0.6m CCL ($k_L = 1 \times 10^{-9}$ m/s) + 3.14 m AL ($k = 1 \times 10^{-7}$ m/s).

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

Beware exposed dam liners

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- Wrinkling is essentially uncontrolled.
- Wrinkles tend not to creep back up slopes, so you often end up with a big wrinkle all along the inner toe, where the slopes meet the floor.
- Leakage rates from exposed liners are much higher than for covered liners with fewer wrinkles.
- Lots of other reasons to cover liners (durability, protection from mechanical damage, protection to underlying layers, theft less likely, etc, etc.)

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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In terms of 2015 Regulations for Residue Deposits and Residue Stockpiles **"competent person"** means a person who-

(i) is qualified by virtue of his or her knowledge, expertise, qualifications, skills and experience; and

(ii) is knowledgeable with the provisions of the National Environmental Management Act, 1998 (Act No. 107 of 1998), National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), Mineral and Petroleum Resources Development Act, 2002 and other related legislation;

(iii) has been trained to recognise any potential or actual problem in the performance of the work; and

(iv) is registered with legislated regulatory body for the natural scientific profession or an appropriate legislated professional body.

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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Addition of sub-section 3(5)

"A competent person must recommend a pollution control barrier system suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis as contemplated in regulations 4 and 5 of the Regulations."

So you can have a non-engineer recommending your pollution control barrier system, who doesn't know what he/she doesn't know. Same applies for engineers don't understand the complexities of liner performance.

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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Circular reference would exist between 3(3) and 5(3)e:

- 3(3) "A risk analysis based on the characteristics and the classification set out in regulation 4 and 5 must be used to determine the appropriate mitigation and management measures."
- 5(3) "The classification of residue stockpile and residue deposit must be undertaken on the basis of the-

  e) pollution control barrier system determined as a result of the risk analysis as contemplated in regulations 4 and 5 of these Regulations."

Does this imply an iterative process?

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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3(3). requires a risk analysis in terms of 4 and 5.

3(5). requires recommendation of a pollution control barrier system by a competent person.

5(3). requires that the classification of the residue stockpile or residue deposit takes into account the pollution control barrier system determined as a result of the risk analysis.

7. covers the design of the residue deposit and residue stockpile but does not require that the engineer takes into account the risk analysis, classification or the recommendation of the pollution control barrier system.

9. requires the right or permit holder ensures the design is followed. *Do they have the expertise to know what is critical to liner performance and why?*

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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By deleting all references to the NEMWA National Norms and Standards for Disposal of Waste to Landfill, not only the liner designs are deleted, so are other requirements, such as:

- Service life considerations
- Efficiency of drainage layers
- Construction Quality Assurance
- Consideration of the compatibility of liner material with the waste stream, in particular noting the compatibility of natural and modified clay soils exposed to salts.

<u>These aspects are key to managing risk.</u>

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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- By removing references to the National Norms and Standards for the Assessment of Waste for Landfill Disposal, there is no clear classification system given in the draft.
- There are no requirements listed for what the risk analysis must include and the level of detail required.
- It's going to be difficult for the risk assessments to be reliable if inputs are not reliable, to put these risk assessments out to market, and for the authorities to assess them.

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Beware…

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Big money at stake – dishonesty could occur throughout the process, including by "professionals".

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Measuring leakage rates

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- Consider where, how and how often leakage rates need to be measured.
- Health and safety is key.
- Must have safe procedures in place.
- Use of flow meters is ideal but flow may be below range for some sites.
- Undertake considered design.

Management of leakage rates

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- Systems engineering approach
- Design
- Construction
- Operation
- Monitoring

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Systems engineering approach

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- Rowe and Hosney (2010) advocate adopting a systems engineering approach to landfill design.
- Any evaluation of leakage must consider how the interaction between different components of the landfill system affects leakage.
- Paper lists 10 factors to consider.

Rowe, R.K. and Hosney, M.S. (2010). A systems approach to minimizing leachate leakage from landfills, 9th International Conference on Geosynthetics, Brazil, 2010, pp 501-510.

Design

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- Separate clean and dirty water.
- Design efficient drainage systems.
- Separate leachate and leakage drainage systems to avoid short-circuiting.
- Consider slope stability, and design to avoid liner tears.
- Avoid exposed geomembranes to limit wrinkling and increase service life.

Design

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- Select & specify good quality materials.
- Consider chemical compatibility.
- Consider material-specific limitations.
- Design for reduced performance with time.
- Consider links between elements.
- Consider constructability.
- Temperature effects?

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Construction

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- Appoint experienced contractors.
- Appoint knowledgable, diligent quality assurance personnel.
- Develop and implement thorough construction quality assurance plans.
- Foster a culture where honesty is the best policy.

Construction

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- Ensure specifications are adhered to.
- Store materials properly.
- Limit geomembrane wrinkling as much as possible.
- Don't allow uninformed design changes.
- Implement reasonable working hours.
- Collect and report on statistics.

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Operation

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- Include assumptions from design in operating documentation.
- Supervise initial filling over liners.
- Maintain systems to work efficiently.
- Know where the lined area is, and mark infrastructure clearly.
- Cover exposed liners to avoid damage and theft.

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Operation

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- Train, retrain and retrain all site staff so they understand why and how liners should be protected, why and how the site drainage systems work, etc.
- Fire breaks, emergency planning and fast emergency response times are necessary to avoid fire damage.

Monitoring

Institute of Waste Management of Southern Africa

- Use the actual versus action leakage rates to determine if there are issues with the facility.
- May allow intervention before environmental impacts occur.
- Use results to improve design for subsequent phases.

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In summary

Institute of Waste Management of Southern Africa

- Leakage rate ranges can and should be determined in the assessment, design and application process.
- Leakage rates can and should be managed through good design, construction, operation, rehabilitation and monitoring.

GIGSA

Institute of Waste Management of Southern Africa

- Geosynthetic Interest Group of South Africa provides a lot of information and annual training courses on various aspects of geosynthetics including liners.
- www.gigsa.org

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Institute of
Waste Management
of Southern Africa

THANK YOU
QUESTIONS?

Riva Nortjé MScEng (Civil) PrEng
Associate, Waste & Tailings
nortje@jaws.co.za

Jones & Wagener
Engineering & Environmental Consultants

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APPENDIX D

Tailings Impoundment Conceptual Design Report (Golder, 2010)

REPORT

COPPER FLAT PROJECT

Conceptual Design Report

Submitted To: New Mexico Copper Corporation
Suite 100 - 2425 San Pedro Dr. NE
Albuquerque, NM 87110

Submitted By: Golder Associates Inc.
4730 N. Oracle Road
Suite 210
Tucson, AZ, 85705 USA

Distribution:
1 Electronic Copy – New Mexico Copper Corporation
1 Copy – Golder Associates

November 17, 2010 **103-92557**

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EXECUTIVE SUMMARY

Copper Flat is a porphyry copper mine that was briefly operated by Quintana Minerals Corp. (Quintana) in 1981 and 1982. After approximately 1 year of operation, mining was halted due to depressed copper prices, and the facility was decommissioned. New Mexico Copper Corporation (NMCC) has acquired an option on the Copper Flat property and is evaluating resuming mining and milling operations. Based on a recent NI 43-101 compliant preliminary economic assessment (PEA, [SRK, 2010]), the ore reserve has been increased from the 60 million tons identified by Quintana, to approximately 100 million tons. Ore will be mined at a rate of 17,500 tons per day (tpd). This report presents the conceptual design of a tailings storage facility (TSF) capable of supporting tailings disposal for the currently identified ore reserve.

During the 1981-82 operating period, high concentrations of total dissolved solids and sulfate were detected in groundwater immediately downgradient from the existing Quintana TSF. Local seepage of contaminated groundwater, which has been attributed to the existence of permeable geologic units in the TSF foundation, allowed process water and tailings seepage to migrate from the impoundment. Existing tailings are now drained and lie above the local groundwater table, however, leaching by meteoric water potentially contributes additional sulfate and dissolved solids to groundwater. Impacted groundwater and tailings from the 1981-82 operations are the subject of ongoing abatement actions. Groundwater compliance issues associated with the Quintana operation have led NMCC to propose construction of a lined TSF for future operations.

The starter dam from the earlier operations remains in place, however, in order to provide the required increase in storage capacity, while limiting future dam height and maintaining gravity delivery of tailings, the facility will be expanded approximately 1,000 feet to the east. It is assumed that the existing starter dam will be used as a borrow source for new embankment construction.

Approximately 1.2 million tons of tailings were placed in the north disposal cell prior to the suspension of operations in 1982. It is assumed that future TSF construction will require the incorporation of measures to mitigate potential groundwater impacts from existing tailings in order to meet groundwater contamination abatement actions. Several options for the management of existing tailings have been considered at a preliminary level. These include:

- Capping existing tailings in-place beneath a low permeability cover such as a geomembrane or composite cover;
- Utilize existing tailings as fine grained bedding fill for the future TSF geomembrane liner; and
- Place existing tailings inside the new TSF on top of the new geomembrane liner.

All options are considered to provide similar benefits relative to mitigating groundwater impacts associated with existing tailings.

The method of tailings embankment construction selected by Quintana was upstream raise construction with peripheral discharge of spigotted whole tailings. The proposed method of construction for the new TSF is by centerline raises with cycloned tailings sand. The tailings surface will rise approximately 80 feet in the first two years of operation. Centerline raising with cycloned sand was selected as the construction method because as a general rule, the tailings rate of rise should be less than 10 feet per year for upstream construction. NMCC's ability to develop a drained and consolidated foundation suitable for upstream raise construction using peripherally spigotted discharge of whole tailings is questionable due to the high rate of rise, which will not drop below 10 feet per year in the first 5 years of operation.

Initial construction will include a toe berm to buttress the tailings embankment and a starter dam for placement of the tailings header line and cyclones. Sand (cyclone underflow) will be placed on the embankment while the tailings slimes (cyclone overflow) will be discharged to the impoundment interior. The TSF geomembrane liner will be placed beneath the starter dam and anchored on the crest of the toe berm. An underdrain system consisting of a filter compatible soil and drainage collection pipes will be placed on top of the geomembrane liner, beneath the sand dam footprint, to facilitate drainage and consolidation of the cycloned sand. The underdrain system will extend into the impoundment interior in the area that will underlie the free water pond. Underdrainage will be routed to a lined underdrain collection pond located downstream of the toe berm.

The TSF can be constructed in a phased manner. During initial construction phases, diversion ditches can be constructed to divert stormwater from upstream catchment areas within the area contributory to the impoundment. The contributory area is approximately equivalent to the ultimate TSF footprint as only minor peripheral areas drain into the TSF. At final buildout, there is minimal potential for surface water runon from external areas. Throughout most of the life of the facility, stormwater management requirements will be limited to direct precipitation.

A review of available aerial photographs indicates no human habitations adjacent to the drainages below the proposed TSF. Based on the rules and regulations of the New Mexico State Engineer, the Copper Flat TSF would be classified as a large dam having significant hazard potential. The impoundment will be required to contain the equivalent of 75 percent of the probable maximum precipitation (PMP) during operations. A spillway capable of passing 75 percent of the PMP will be required upon closure.

Geotechnical investigation (SHB, 1980) of the existing TSF area was extensive, however, a portion of new TSF will occupy ground that has not been evaluated for geotechnical and hydrogeological conditions. A preliminary site investigation plan is presented in this conceptual design report.

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List of Drawings

1.0 INTRODUCTION

1.1 Scope of Work

New Mexico Copper Corporation (NMCC) has acquired an option on the Copper Flat property, located near Hillsboro in Sierra County, New Mexico. Copper Flat is a porphyry copper deposit that was briefly mined by Quintana Resources in 1981 and 1982 before depressed copper prices forced the suspension of mining and milling operations. During the Quintana operation, the identified ore reserve was approximately 60 million tons. Further drilling completed since cessation of mining operations has increased the ore reserve from 60 million to approximately 100 million tons. NMCC has commissioned Golder Associates Inc. (Golder) to develop the conceptual design of a new tailings storage facility (TSF) capable of containing tailings from the expanded mining operation. Conceptual design of the new TSF, as well as plans for geotechnical investigation of the expanded TSF footprint and fulfilling data collection requirements necessary to advance the TSF design to feasibility and construction level are presented in this report.

1.2 Project History

The Quintana operation included open pit mining, conventional milling and off-site shipment of copper concentrate. Tailings were thickened to a solids content of 50 percent by weight (oral communication, Jack Bailey, 10/02/2010) and transported by gravity flow to the existing TSF located approximately 1 mile east of the open pit. Impoundment construction and operation were typical of the industry practices of the day. Whole tailings were discharged into the impoundment via a tailings header line and spigots placed peripheral to the impoundment. The TSF constructed for the Quintana operation remains in-place to this date. Remaining facilities include the starter embankment, internal splitter dikes, concrete decant towers and presumably, buried under drain pipes. Approximately 1.2 million tons of tailings were deposited in the existing north tailings cell.

The tailings thickener is reported to have been partially decommissioned and buried. The tailings delivery system has been removed. The Greyback Wash diversion, electrical supply lines, a water supply well field and water supply pipeline, groundwater monitoring wells and pumpback wells also remain. Milling and processing facilities were decommissioned and removed from the site.

During Quintana operations, elevated sulfate and dissolved solids were detected in groundwater in the vicinity of the existing tailings dam. Permeable foundation materials encountered during site investigation and construction of the TSF have been identified as the potential pathway for seepage from the TSF, Meteoric water leaching of tailings from the Quintana operation potentially contributes additional sulfate and dissolved solids to local groundwater. Impacted groundwater and the existing tailings are the subject of an ongoing abatement action. Management of existing tailings to mitigate existing and ongoing groundwater impacts is considered a parallel objective of TSF design.

2.0 SITE DESCRIPTION

2.1 Existing Conditions

The location of the proposed TSF is shown on Drawings 1 and 2. Elevation in the TSF basin area ranges from approximately 5,160 feet above mean sea level (amsl) near the base of the toe berm to over 5,500 feet on the ridges northwest of the impoundment footprint. Natural slopes range from 2 horizontal to 1 vertical (2H:1V) adjacent to the perimeter ridges to less than 10H:1V in the lower portion of the basin.

Previous disturbance of the TSF area is widespread. Existing features can be seen in the aerial photograph on Drawing 1. Drawing 2 shows the location of the proposed TSF projected on existing topography. Placer mining disturbance that predates the Quintana operation can be seen in most of the drainages in the TSF basin, and other drainages radiating from the mine area. More recent disturbance associated with the Quintana mining operation includes tailings deposits, the old starter dam and splitter dikes, construction material borrow areas and tailings delivery and reclaim water pipeline routes. Two concrete decant towers and concrete reclaim pipe foundations also remain in place and while not visible, buried reclaim water pipes also occur. A series of monitoring wells have been placed around the toe of the old starter dam.

The TSF site is located in the upper reaches of a shallow basin. The basin is bounded by low hills on the southwest, west and north sides such that the ultimate TSF will occupy most of the area that could contribute surface water runoff to the TSF. While diversions will be required in the early stages of the operation to divert stormwater runoff, peripheral areas contributing stormwater runon during the later stages of the future operations will be limited to a few acres on the northwest side of the TSF.

2.2 TSF Area Geology and Foundation Conditions.

The existing TSF site was extensively explored by Sargent, Hauskins and Beckwith (SHB) in 1979 and 1980 as part of the SHB design effort. No additional field work was conducted as part of conceptual design efforts. The upper layer of soils in the vicinity of the existing starter dam consists of sandy materials. Surficial sand is underlain by a wedge of silty clays, clayey and clayey silts that appears to thicken in a easterly direction. Gravels underlie the silts and clays and outcrop in the upper portion of the TSF basin. These gravels appear to have been the borrow source for the existing dam.

Permeable basalt was encountered in the lower portion of the tailings basin. The basalt is presumed to occupy a paleo-drainage cut in the local foundation soils. It can be seen in outcrop and subcrop south of the existing splitter dike and was intercepted in several exploratory boreholes completed in the central starter dam area. Due to its permeable nature, the basalt has been identified as the likely pathway for seepage and contaminants from the existing impoundment. This potential was identified during the design of the existing impoundment, and an attempt was made to cap the basalt with fine grained, low permeability soils to inhibit seepage.

2.3 Climate

The Copper Flat property experiences on the order of 10 to 13 inches per year of precipitation with the majority of rainfall occurring in the summer months associated with short duration, high intensity thunderstorms. Winter rains are associated with Pacific storms that generally migrate from west to east across the desert southwest. Summer temperatures exceed 100 degrees while winters are generally mild with limited snow and ground freezing.

In general, evaporation exceeds precipitation in desert lowlands across the region. It is anticipated that the tailings impoundment will be operated at net negative water balance, with periodic, temporary accumulation of stormwater from direct precipitation. Stormwater will be recovered with tailings supernatant water and reused in milling and processing. The effect of stormwater accumulation will be a reduction in raw make-up water requirements.

3.0 PROPOSED TAILINGS STORAGE FACILITY DESCRIPTION

3.1 TSF Geometry

The proposed method of tailings embankment construction is by the method of centerline raises. The basis for selection of this method is due to the high rate of tailings rise that will be experienced during the first 3 to 4 years of operation. Construction by upstream raises typically requires a rate of tailings rise of approximately 10 feet per year or less in order to allow consolidation and drainage of impounded tailings, and the development of conditions suitable for supporting upstream raises. The centerline method of construction using cycloned sand will allow the embankment to be constructed on a foundation of well drained sand.

A toe berm will be constructed around the periphery of the TSF which will serve as a buttress to the embankment outslopes. An internal starter dam is proposed for placement of the tailings discharge header pipe. Tailings will be delivered at a rate of 17,500 tpd at an anticipated solids content of 50 percent by weight. At 92 percent availability, the annual tailings deposition rate will be 5.88 million tons.

Cyclones on the tailings header line will be used to separate the sand fraction (cyclone underflow) from the whole tailings stream. Tailings sand will be used for embankment construction while the fine fraction of the tailings, the tailing slimes (cyclone overflow), will be discharged into the impoundment interior. The resulting tailings impoundment surface will slope away from the embankment and force tailings supernatant and stormwater into the interior of the impoundment. The locations of the toe berm and starter dam are shown on Drawing 3.

The crest elevation of the starter dam and toe berm have initially been set at 5,220 feet amsl. Adjustments to the height of these structures will be evaluated in detailed design studies. Starter dam height will be determined by the dry freeboard required to maintain stormwater storage capacity and the volume of sand that will be available for dam construction during operations. The availability of sand will be determined by the degree of ore milling. A finer grind will reduce sand content and could require a higher initial starter dam height while a coarser grind will provide more sand and allow an increased rate of sand deposition. Toe berm height will be influenced by the stability of the tailings embankment. The embankment sand and underdrain will be placed over a geomembrane liner. Interface friction at the liner/subgrade and the liner/underdrain interfaces will be reduced relative to the friction developed at a soil to tailings interface. The berm may be required to buttress the embankment toe to enhance stability. Toe berm and initial starter dam heights will be evaluated when tailings products representative of the future processing plan are available for evaluation and geotechnical testing.

Above the elevation of the initial starter dam and toe berm, these structures will be constructed parallel to existing topography with a constant height above foundation level. Progressive lateral extension of the tailings distribution points up the starter dam will enable the dam to be raised in level manner.

Tailings gradation data presented in the various reports prepared for Quintana are somewhat contradictory. Based on metallurgical pilot studies conducted for Quintana and reported by SHB (1980), the sand fraction (the plus 200 standard sieve fraction) of the tailings is approximately 30 percent with 95 percent finer than 65 mesh (208 microns). Measurements collected by Quintana mill personnel between May and June of 1982 (oral communication, Jack Bailey, 10/1/2010) showed a minus 65 mesh fraction of 84 to 89 percent, suggesting a courser tailings grind with a higher sand fraction was produced under operating conditions. The gradation presented in the SHB geohydrological study (SHB, 1981) indicates tailings that are 100 percent finer than 65 mesh with a sand fraction of 55 percent. Preliminary volumetric estimates indicate that embankment construction will require approximately 15 percent of future tailings, suggesting that the centerline approach is feasible. Evaluation of tailings samples produced in pilot or bench scale simulation of future milling and processing will be required to verify sand availability throughout the life of the operation.

The impoundment has been sized based on a post-deposition dry density of 85 pounds per cubic foot (pcf). The estimated maximum final tailings surface elevation is 5,375 feet amsl. The maximum toe to crest height of the tailings embankment will be approximately 215 feet. At final buildout, the TSF and underdrain collection pond will occupy an area of approximately 541 acres. The anticipated configuration of the TSF at the end of mining and milling operations is shown on Drawing 4. TSF cross sections are shown on Drawing 5.

The tailings surface will slope inward from peripheral points of deposition at approximately ½ to 1 percent forming a depression in the interior of the impoundment. The internal depression will serve as a storage area for supernatant solutions and stormwater.

Embankment outslopes shown on the drawings are 2.67H:1V. Outslopes may also be subject to modification based on geotechnical testing of tailings properties.

3.2 Hazard Classification

The rules and regulations of the New Mexico State Engineer indicate that the Copper Flat TSF will be classified as having significant hazard potential. According to the New Mexico Administrative Code (19.25.12.10 B NMAC):

> *Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.*

The TSF lies within the Greyback Wash drainage. Inspection of aerial photographs (Google Earth) indicates no human habitations in or adjacent to Greyback Wash between the TSF facility and Caballo Lake, into which Greyback Wash ultimately discharges. A dam breach and flood routing analysis will be required by the State Engineer (19.25.11.12 C (1) NMAC) to verify this classification.

The spillway design flood for dams with significant hazard potential (19.25.12.11 C(1) (c) is 75 percent of the probable maximum precipitation (PMP). A preliminary estimate of the PMP is on the order of 25 inches. The TSF and ore processing facilities will be operated as a closed, non-discharging system during tailings disposal operations and storage capacity for the design storm event will be maintained within the TSF. A permanent spillway capable of passing the design flood will be required at closure after the tailings surface has been regraded and a reclamation cover is in place.

3.3 Site Preparation

The TSF will be a geomembrane lined structure. Site preparation will include clear and grubbing, salvage and stockpiling of topsoil and grading to prepare a smooth surface for geomembrane liner installation.

It is anticipated that the existing starter dam and associated splitter dikes will be used as a fill material borrow source for the new toe berm and starter dam. Additional borrow areas for structural fill, liner bedding materials and drainage media will be developed within the TSF footprint where possible. Previous geotechnical investigation of the site indicates a range of fine grained soils and granular materials occur within the existing disturbance area.

Approximately 1.2 million tons of tailings were discharged into the existing TSF during the Quintana operation. Existing tailings deposits will be evaluated as a source of liner bedding fill material. If placed or "capped" under a low permeability TSF liner, the potential for leaching sulfate and dissolved solids from existing tailings in the future will be alleviated. Alternatively, existing tailings could be placed on the new TSF liner however, utilization of the tailings as liner bedding fill material is anticipated to be less costly and will provide similar benefits in terms of mitigating leaching potential.

The existing decant towers will be demolished. Demolition debris will be buried locally or placed in a waste rock disposal facility. Demolition requirements for buried decant pipelines will be evaluated as part of ongoing site investigation and design efforts.

Existing wells in the TSF expansion will require abandonment in accordance with New Mexico Environment Department (NMED) Office of the State Engineer (OSE) regulations. For wells that intercept groundwater, this will include removal of casings if possible, and sealing the entire well bore with cement or bentonite grout placed by tremmie pipe. Approximately 18 wells appear to lie within the TSF expansion area.

3.4 TSF Liner System

Proposed liner system details for the TSF and underdrain collection pond are shown on Drawings 6 and 7. The TSF liner will consist of an HDPE geomembrane placed on a minimum 6-inch thick layer of liner bedding fill. Beneath the starter dam and embankment underdrain, an 80 mil (0.080 inches) geomembrane is proposed while within the impoundment interior, the geomembrane thickness will be 60 mil. The underdrain collection pond liner will consist of a lower 60 mil and upper 80 mil HDPE

geomembranes separated by a drain net. The drain net will route potential leakage through the upper liner to a leakage collection and recovery sump.

Geomembrane liner will be placed on a minimum 6-inch thick layer of liner bedding fill. As noted above, the liner bedding fill can be constructed with existing tailings if they meet moisture content and compaction requirements. Additional liner bedding fill material can be derived from crushing and/or screening of selected native soils. A minus 3/8-inch material is suitable for protection of the liner.

3.5 Underdrain System

An underdrain will be placed beneath the starter dam and cycloned sand embankment. The underdrain system is shown on Drawing 6. The purpose of the embankment underdrain is to facilitate drainage and consolidation of cycloned sand placed in the tailings embankment. The underdrain will consist of graded sand and gravel that is filter compatible with the tailings sand. A series of perforated drain pipes will be placed within the underdrain layer to carry tailings drainage to the underdrain collection pond.

The under drain will be extended into the impoundment interior beneath the area that will be occupied by the supernatant pool. Production of drainage material that is filter compatible with the tailings slimes discharged into the impoundment interior will not be feasible. The impoundment underdrain will be separated from the tailings slimes by a geotextile filter fabric cover. Impoundment underdrainage will be routed to the underdrain collection pond in a piping system that is separate from the embankment under drain.

The pond layout presented as part of the conceptual design has a capacity of over 40 million gallons and represents the maximum potential construction area required for underdrain pond installation. Water balance and drainage analyses that will be completed during engineering design studies will be used to determine the underdrain collection pond size required to manage tailings underdrainage.

3.6 Water Reclaim

A water reclaim ramp with be constructed on top of the TSF liner system. The ramp will provide access to the free water pool for reclaim of supernatant solution and stormwater. The ramp will be raised and extended as deposition continues and the impoundment surface rises. The reclaim pump works will be progressively moved northward as the operation proceeds.

The ramp will be constructed with borrowed fill or waste rock from the mining operation. A cushioning layer will be placed beneath the initial ramp fill to protect the underlying geomembrane. The ramp presents an opportunity to dispose of potentially acid generating waste rock in an environment where ongoing tailings disposal will result in the ramp fill being encapsulated within low permeability tailings slimes.

3.7 Tailings Distribution

It is anticipated that a new thickener will be constructed at the location of the Quintana thickener (Drawing 2) and a tailings delivery pipeline will be routed to the impoundment through the existing tailings delivery pipeline cut. At the impoundment, a wye in the delivery pipeline will allow the tailings to be directed to the east and west to the starter dam crest. A series of discharge points and cyclones around the periphery of the impoundment will be used to direct cyclone underflow to the tailings embankment and cyclone overflow into the impoundment interior. Discharge will be cycled around the impoundment to raise the embankment in a level manner.

Regrading and compaction of the cycloned sand deposited on the dam crest will be conducted on a regular basis to densify the tailings embankment and achieve the design embankment outslope.

Drawing 8 presents a height versus capacity plot for the new TSF. There is potential to increase the capacity of the TSF beyond that shown on the plot, however, distribution of tailings above the elevation of 5,375 feet amsl is likely to require pumping of the whole tailings slurry. In addition, a tailings booster pump may be required in the later years of operation to maintain adequate pressure for cyclone operation.

3.8 Surface Water, Underdrainage, Stormwater and Supernatant Management

The intent of design is to allow the TSF to be operated as a zero discharge facility. Drainage from the tailings will be collected in an underdrain system, routed to a lined underdrain collection pond and recycled as process water. Potential runon from peripheral contributory areas will be prevented from contacting the tailings and diverted into natural drainages. Stormwater, which will result primarily from direct precipitation and supernatant will be contained within the impoundment.

3.8.1 Surface Water Diversion

During initial construction, perimeter diversions will be constructed across the west periphery of the impoundment. The approximately location of Phase 1 surface water diversions is shown on Drawing 3. As the impoundment is expanded in subsequent construction phases, diversion ditches will be relocated westward.

Potential runoff from peripheral areas west of the impoundment during the later stages of operation will be evaluated during design studies. Where runon is significant, diversion ditches will be investigated.

As noted above, at final buildout the TSF will occupy the majority of the area that can contribute surface water runon into the tailings impoundment. Only limited areas west of the impoundment might require late stage and post-closure diversion.

3.8.2 Stormwater and Supernatant Management

During operations, capacity will be maintained within the TSF for storage of direct precipitation and tailings supernatant. Upon discharge into the impoundment, tailings will form a beach sloping away from the point of discharge at ½ to 1 percent. The resulting depression on the tailings surface in the interior of the impoundment will be used for water storage. Additional storage capacity, if needed, will be developed by maintaining reserve freeboard on the tailings embankment crest.

A detailed water balance will be developed as part of the design studies to evaluate internal storage and embankment freeboard requirements. Water balance inputs include process water inflows, direct precipitation and runon. Losses include process water reclaim, beach and tailings pond evaporation, underdrainage and entrainment of process water within the tailings pore space. The rates of underdrainage, entrainment and tailings supernatantliberation on discharge will be determined through geotechnical testing of representative tailings samples.

Water storage requirements include:

- Dead storage (water that cannot be recovered by the reclaim system);
- Storage of the normal process water inventory to facilitate continuous operations;
- Normal stormwater storage which will vary on a seasonal basis due to changes in monthly precipitation and evaporation rates; and
- Storage for the design storm event, which is currently assumed to be 75 percent of the PMP.

The water balance will be coupled with a discharge model that will track the rate of tailings rise and simulate beach slopes and the topography of the tailings surface. The water balance and discharge model can then be used to estimate internal storage capacity and requirements for embankment freeboard through the life of the facility.

4.0 CLOSURE AND RECLAMATION

The conceptual closure plan for the TSF is illustrated on Drawing 9. The conceptual closure plan includes the following:

- Final grading of embankment outslopes to establish erosion controls and controlled surface water drainage (best management practices);
- Placement of a soil or rock cover and revegetation of the embankment outslope;
- Placement of riprap and erosion controls in embankment surface water drainage facilities;
- Regrading or depositional modification of the impoundment surface to promote drainage to a permanent spillway;
- Placement and vegetation of a soil cover over the tailings surface;
- Armoring of surface drainage channels and implementation of best management practices for erosion control; and
- Management of underdrainage.

Final grading of the impoundment surface can be accomplished with earthmoving equipment, or through modification of tailings disposal patterns during the final years of operation. Tailings discharge from selected locations can be used to relocate the supernatant pool to a location adjacent to the post-closure spillway, thereby reducing grading requirements and limiting earthmoving operations in areas where working conditions are expected to be difficult due to the presence of soft and saturated tailings. At the location of the spillway shown on Drawing 9, a bedrock foundation is anticipated. If the spillway channel is erodible, grouted riprap or other erosion controls will be applied.

Consolidation seepage into the underdrain system can be anticipated to continue at declining rates for an indefinite period following the cessation of tailings disposal operations. Underdrainage will be pumped from the underdrain collection pond to the surface of the tailings impoundment where it can be evaporated or used for reclamation cover irrigation. When underdrainage is reduced to an acceptably low flow rate, the underdrain pipes beneath the embankment can be sealed with grout and the underdrain collection pond can be decommissioned.

5.0 DATA COLLECTION AND DESIGN STUDY REQUIREMENTS FOR ADVANCING TSF DESIGN

The following defines work to be completed to advance the design of the new TSF to feasibility study and construction level.

5.1 Geotechnical Investigation

5.1.1 Existing TSF Area

The area occupied by the Quintana TSF area was extensively investigated by SHB (1980). Approximately 30 boreholes were drilled along the starter dam alignment. The majority of the borings were completed by hollow stem auger (HSA) and locally included in-situ permeability testing and diamond coring. Additional borings were completed in the impoundment interior. Test pits were excavated inside the impoundment on an approximate 500 foot by 500 foot grid.

Additional exploration will be undertaken in the area investigated by SHB to identify borrow areas for liner bedding fill and drainage media. This work is expected to require a test pit exploration program with native soil samples subjected to gradation analysis, Atterburg limits, permeability and compaction testing. This program will include sampling of existing tailings for compaction and permeability testing.

TSF Expansion Area investigation should include the following:

- A seismic velocity survey to evaluate the depth to bedrock and/or competent materials beneath the new embankment axis;
- Hollow stem auger drilling with standard penetration testing to obtain foundation material samples and measure in-situ density. Borehole spacing on the order of 300 to 500 feet is proposed along the new embankment axis.
- Selected HSA borings will be converted to core drilling to enable recovery of bedrock samples and support measurement of in-situ permeability by packer testing.
- Falling head or constant head permeability testing may also be performed in selected borings.
- Shelby tube and split spoon drive ring samples will be collected from selected intervals for analysis of in-situ density, natural moisture content and settlement potential.
- Test pit excavation will be performed in the expansion area to identify potential construction materials outside the previously explored area. Required materials include structural fill for the toe berm and starter dam, liner bedding fill and drain fill.

5.2 Tailings Characterization

NMCC reports that ore processing at Copper Flat will closely follow the process flow sheet developed by Quintana for 1981-82 operations. The characteristics of future tailings will impact operation of the new TSF. There are limited data concerning tailings properties from the Quintana operation, and production records (Oral communication, J. Bailey, 2010) indicate a coarser tailings product was produced during operations than would be predicted based on the pilot study tailings data presented in the original TSF design report (SHB, 1980).

Pilot or bench scale milling and flotation studies are recommended in support of final design studies to determine the physical and geochemical properties of future tailings. The primary objectives of the proposed study include:

- Evaluation of the partitioning of residual sulfides between cyclone underflow and overflow, and assessment of the acid generating and metal leaching potential of both the sand and slimes fractions;
- Determination of the gradation of future whole tailings and the quantity of sand that can be recovered for embankment construction;
- Evaluation of the flow characteristics of the whole tailings slurry;
- Measurement of the shear strength of tailings sand; and
- Measurement of the permeability of tailings sand and slimes under anticipated disposal conditions.

The milling and flotation test work should produce a sufficient quantity of tailings to enable a cyclone simulation to be performed in order to produce samples of both cyclone overflow and underflow. At minimum, the cyclone simulation will require a 55 gallon drum of tailings solids. The sand and slimes fractions produced in the simulation will be sufficient to support a full range of geotechnical and geochemical tests. Tailings should be subjected to the following tests:

- Gradation (sieve and hydrometer), Atterberg Limits, specific gravity (whole tailings, cyclone underflow and overflow);
- Compaction testing (cyclone underflow);
- Slurry consolidation testing (cyclone underflow and overflow);
- Staged triaxial consolidated, undrained shear strength testing with pore pressure measurement (cyclone underflow);
- Air drying (cyclone overflow);
- Shrinkage limit (cyclone overflow); and
- Acid base accounting, net acid generation (NAG), total metals, major oxides by x-ray florescence (XRF), leach extraction testing, and mineralogy by x-ray diffraction (XRD) (cyclone underflow and overflow).

5.3 Hydrogeological Characterization

Local monitoring wells that will be decommissioned during TSF expansion will require replacement in the area below the new toe berm and underdrain collection pond. Water level measurements and in-situ permeability tests conducted concurrently with drilling and well installation can be used in conjunction with existing data to evaluate hydrogeological conditions in the TSF expansion area.

5.4 Climatological Characterization

Estimation of normal precipitation and evaporation rates will be required to develop an impoundment water balance. It is assumed that a climatological model will be developed using a combination of locally collected weather data combined with regional weather records from National Weather Service monitoring stations.

5.5 Engineering Studies

The following is a listing of design studies that will be required to complete the design of the TSF:

- Foundation settlement analyses;
- Tailings drainage analyses;
- Seismic hazard analysis:
- Static and dynamic embankment stability analyses, including estimation of displacement under seismic loading;
- Seismic and static (monotonic loading, flow slide) liquefaction potential analyses;
- Evaluation of tailings sand availability, mass balance and deposition modeling;
- Liner seepage assessment;
- Foundation hydrogeological assessment;
- Water balance;
- Tailings basin hydrologic assessment for surface water diversion sizing;
- Estimation of design storm event (PMP) precipitation;
- Dam breach analysis as per OSE requirements.

6.0 USE OF THIS REPORT

This report has been prepared exclusively for the use of New Mexico Copper Corporation (NMCC) for specific application to the Copper Flat Project. No third party engineer or consultant shall be entitled to rely on any of the information, conclusions, or opinions contained in this report without prior written approval from NMCC or Golder Associates, Inc (Golder).

The conclusions and recommendations in this report have been prepared in a manner consistent with the level of care and skill ordinarily exercised by engineering professionals currently practicing under similar conditions, subject to the time limits and financial and physical constraints imposed on, or otherwise applicable to, Golder's analyses.

In preparing its conclusions and recommendations, Golder has relied upon information provided by the client. Golder is not responsible for errors or omissions in the information provided by NMCC.

GOLDER ASSOCIATES INC.

Eugene Muller, P.E.
Senior Engineer

David A. Kidd, P.E.
Principal, Geotechnical Practice Leader

GM/DAK/br

7.0 REFERENCES

Jack Bailey, October 1, 2010. Oral Communication, milling records, 65 mesh fraction, Quintana Minerals Corp, April through June 1982.

Google.Com, 2010, Google Earth images, 32° 57'33" N, 107° 29' 57 'W

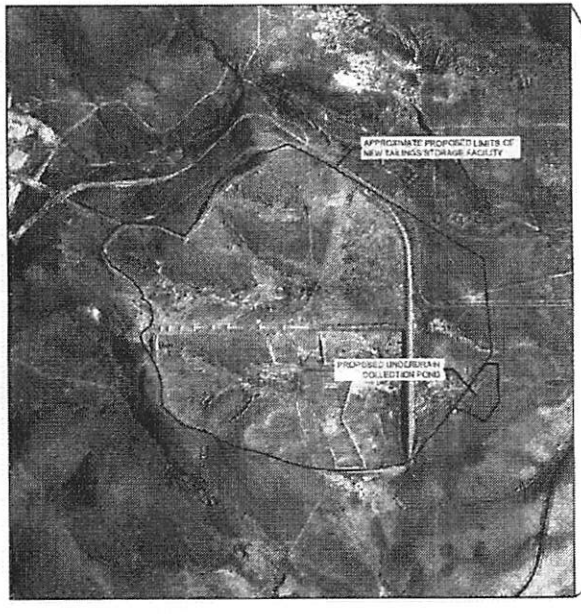
Sargent Hauskins and Beckwith (SHB), 1981. *Geohydrological Evaluation for Submission of Discharge Plan, Copper Flat Project, Quintana Minerals Corporation, Sierra County, New Mexico.* SHB Report E80-194, June 21, 1981.

Sargent Hauskins and Beckwith (SHB), 1980. Tailings Dam and Disposal Area, Quintana Minerals Corporation, Copper Flats Project, Gold Dust, New Mexico (Final Geotechnical and Design Development Report), SHB Report E80-1030B, October 14, 1980.

SRK Consulting Inc., 2010. *NI 43-101 Preliminary Economic Assessment, THEMAC Resources Group Limited, Copper Flat Project, Sierra County, New Mexico,* SRK Report No. 191000.020, June 30, 2010

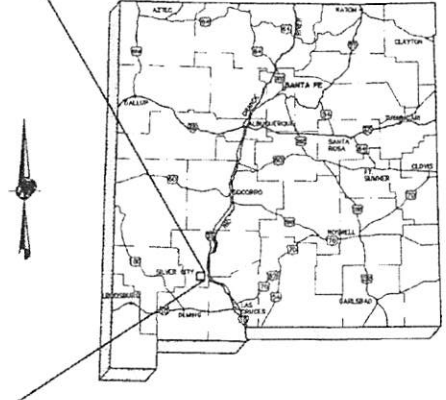
DRAWINGS

COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO



AERIAL PHOTOGRAPH OF PROPOSED TAILINGS DISPOSAL SITE

NOT TO SCALE



STATE OF NEW MEXICO

NOT TO SCALE

LIST OF DRAWINGS

DWG No.	DRAWING TITLE
1	TITLE SHEET
2	GENERAL SITE LAYOUT
3	TAILINGS STORAGE FACILITY PLAN
4	TAILINGS STORAGE FACILITY PLAN AT FINAL BUILD-OUT
5	TAILINGS STORAGE FACILITY CROSS-SECTIONS
6	TAILINGS STORAGE FACILITY UNDERDRAIN PLAN
7	TAILINGS STORAGE FACILITY DETAILS
8	TAILINGS STORAGE FACILITY HEIGHT VS CAPACITY PLOT
9	TAILINGS STORAGE FACILITY CONCEPTUAL CLOSURE PLAN

GENERAL NOTES

1. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
2. AERIAL PHOTOGRAPHY IS GOOGLE 2010, NMRGIS 2010.
3. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A PROPOSED NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT.
4. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD).
5. AERIAL PHOTOGRAPH SHOWS EXISTING TAILINGS DISPOSAL AREA DISTURBANCE FROM MINING, MILLING AND TAILINGS DISPOSAL OPERATIONS CONDUCTED BY QUINTANA RESOURCES IN 1981-82.
6. EXISTING TAILINGS FROM THE QUINTANA 1981-82 OPERATIONS ARE THE SUBJECT OF AN ONGOING ABATEMENT ACTION. THE CONCEPTUAL DESIGN CONSIDERS CAPPING EXISTING TAILINGS BENEATH THE FUTURE IMPOUNDMENT LINER SYSTEM THROUGH THEIR INCORPORATION IN THE LINER BEDDING FILL LAYER. OR PLACEMENT OF EXISTING TAILINGS ON THE NEW IMPOUNDMENT LINER. ALTERNATIVES FOR MANAGEMENT OF EXISTING TAILINGS WILL BE DEVELOPED IN CONSULTATION WITH NMED.

DAVID ALAN KIDD
NEW MEXICO
13778
REGISTERED PROFESSIONAL ENGINEER
11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION	PROJECT: COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
	TITLE: TITLE SHEET

Golder Associates

PROJECT No.		103-92557	FILE No.		1039255 7A001
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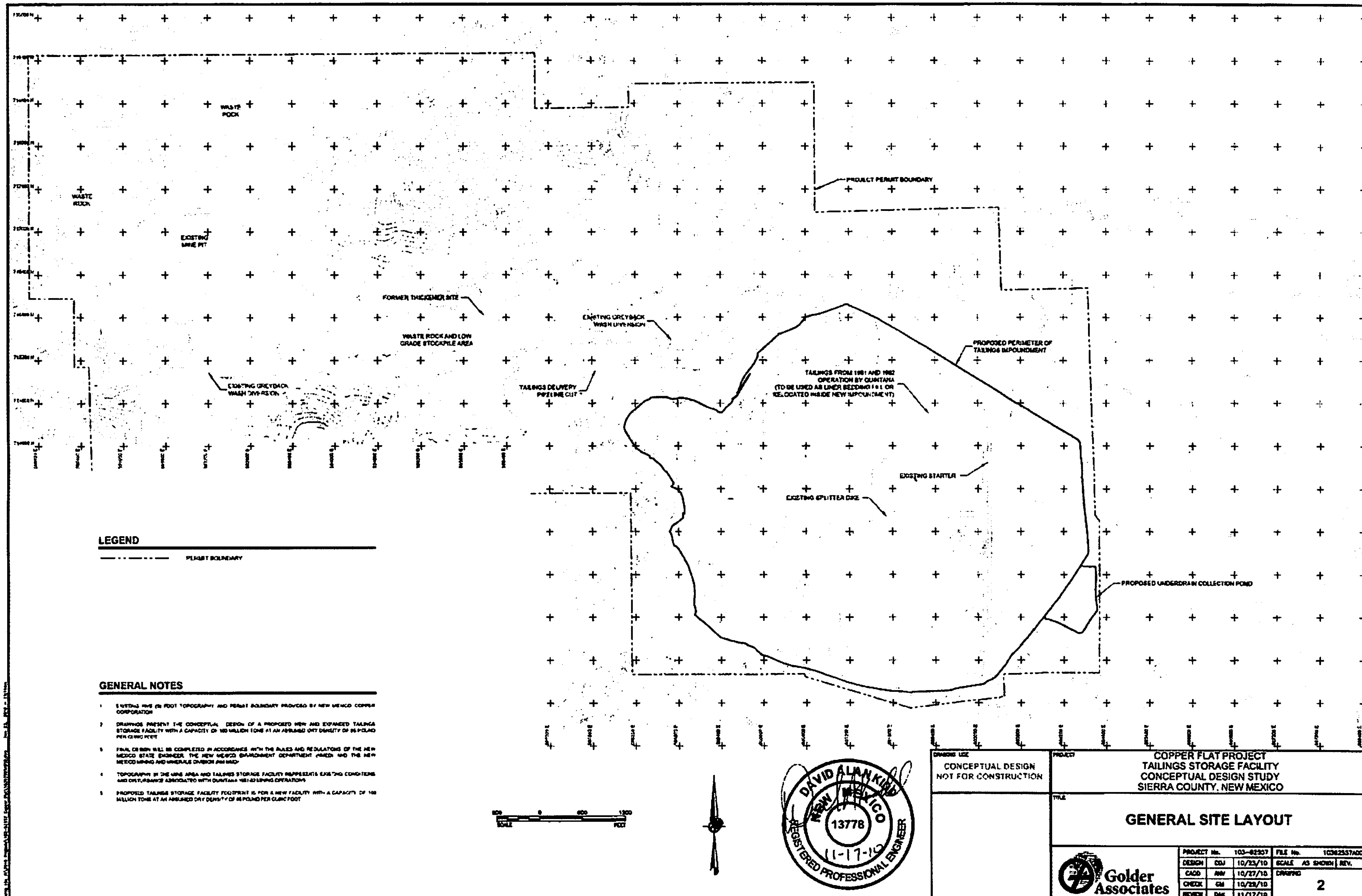
PROJECT PERMIT BOUNDARY
WASTE ROCK
EXISTING MINE PIT
FORMER THICKENER SITE
WASTE ROCK AND LOW GRADE STOCKPILE AREA
EXISTING GREYBACK WASH DIVERSION
TAILINGS DELIVERY PIPELINE CUT
PROPOSED PERIMETER OF TAILINGS IMPOUNDMENT
TAILINGS FROM 1981 AND 1982 OPERATION BY QUINTANA (TO BE USED AS LINER BEDDING 1 & 1 OR RELOCATED INSIDE NEW IMPOUNDMENT)
EXISTING STARTER
EXISTING SPLITTER DIKE
PROPOSED UNDERDRAIN COLLECTION POND
LEGEND
PERMIT BOUNDARY
GENERAL NOTES
13778
DAVID ALAN KIRK
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER
11-17-10
DRAWING USE
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION
PROJECT
COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO
TITLE
GENERAL SITE LAYOUT
Golder Associates
PROJECT No. 103-82357
FILE No. 10382357A002
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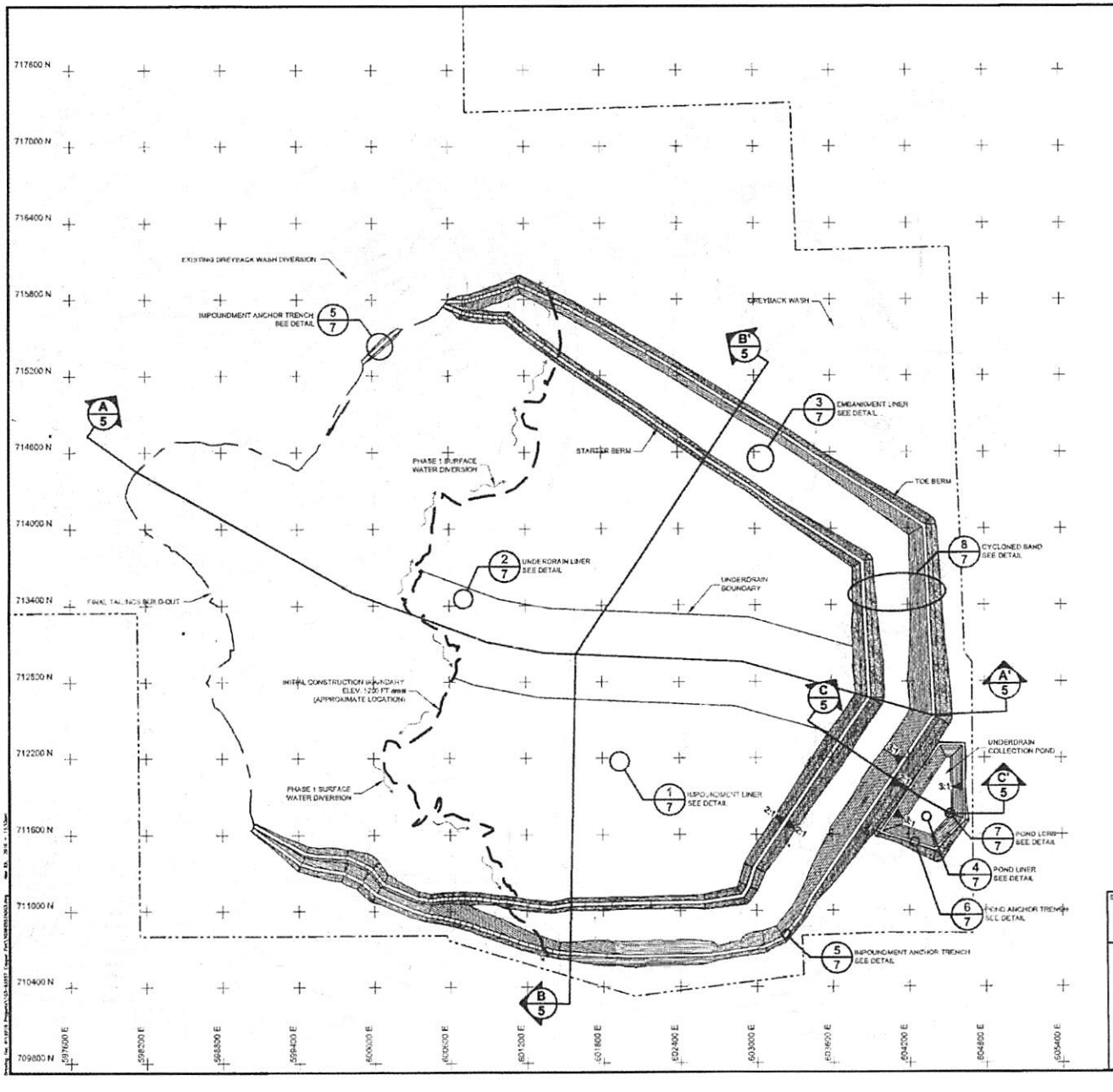
CHECK GM 10/28/10
REVIEW DAK 11/17/10
SCALE AS SHOWN
REV. B
DRAWING
2



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PHASE 1 SURFACE WATER DIVERSION FLOW ARROW
- PERMIT BOUNDARY
- INITIAL CONSTRUCTION BOUNDARY
- FINAL TAILINGS BUILD-OUT
- 3/7 DETAIL CALL-OUT
- A/5 CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 190 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD).
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
4. TOPOGRAPHY IN THE VICINITY OF THE QUINTANA STARTER DAM AND TAILINGS CELLS APPROXIMATED BY GOLDER TO REPRESENT PRE-CONSTRUCTION TOPOGRAPHY FOLLOWING DEMOLITION (SCARROW) OF THE EXISTING STARTER EMBANKMENT, RELOCATION OF EXISTING TAILINGS AND REGRADING IN FORMER BORROW AREAS AND EXISTING DISTURBANCE AREAS. TOPOGRAPHY IN OTHER LOCATIONS REPRESENTS EXISTING CONDITIONS. A SITE WIDE TAILINGS DISPOSAL FACILITY GRADING PLAN WILL BE DEVELOPED IN FUTURE DESIGN STUDIES.
5. EXISTING TAILINGS FROM THE QUINTANA 1981-82 OPERATIONS ARE THE SUBJECT OF AN ONGOING ABATEMENT ACTION. THE CONCEPTUAL DESIGN CONSIDERS CAPPING EXISTING TAILINGS BENEATH THE FUTURE IMPOUNDMENT LINER SYSTEM THROUGH THEIR INCORPORATION IN THE LINER BEDDING FILL LAYER, OR PLACEMENT OF EXISTING TAILINGS ON THE NEW IMPOUNDMENT LINER. ALTERNATIVES FOR MANAGEMENT OF EXISTING TAILINGS WILL BE DEVELOPED IN CONSULTATION WITH NMED.
6. PHASE 1 CONSTRUCTION LIMITS ARE APPROXIMATELY LOCATED. PHASE 1 AND SUBSEQUENT CONSTRUCTION PHASE LIMITS AND SURFACE WATER DIVERSION REQUIREMENTS WILL BE DETERMINED IN FUTURE ENGINEERING DESIGN STUDIES.
7. EMBANKMENT RAISES WILL BE CONSTRUCTED BY THE CENTERLINE RAISE METHOD USING CYCLONE UNDERFLOW (TAILINGS SAND). CYCLONE OVERFLOW (SLIMES) WILL BE DISCHARGED INTO THE INTERIOR OF THE TAILINGS STORAGE FACILITY.
8. DURING OPERATION, STORMWATER WILL BE CONTAINED WITHIN THE TAILINGS STORAGE FACILITY AND UTILIZED AS PROCESS MAKE-UP WATER. A PROJECT WATER BALANCE WILL BE DEVELOPED IN FUTURE ENGINEERING DESIGN STUDIES.

DAVID ALAN KIDD
NEW MEXICO
13778
11-17-10
REGISTERED PROFESSIONAL ENGINEER

SCALE 400 0 400 800 FEET

DRAWING USE
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

PROJECT
COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE
TAILINGS STORAGE FACILITY PLAN

Golder Associates

PROJECT No.	103-92557	FILE No.	10392557A003		
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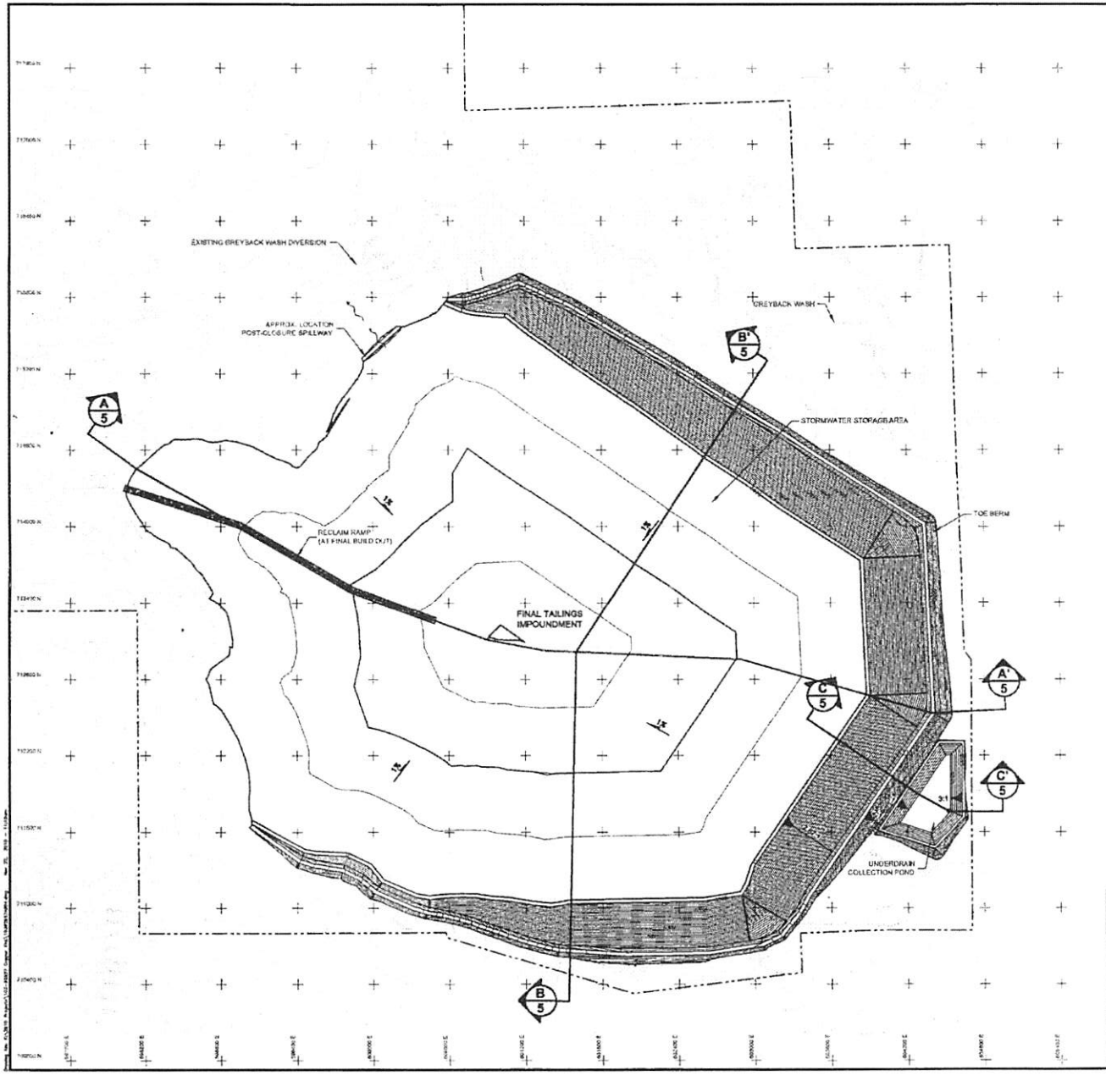
19018



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PERMIT BOUNDARY
- A/5 CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NMMMD).
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
4. FINAL EMBANKMENT CREST HEIGHT WILL BE APPROXIMATELY 5,375 FEET AMSL. TAILINGS SURFACE CONFIGURATION SHOWN REPRESENTS CONDITIONS AT THE CESSATION OF MINING OPERATIONS. APPROXIMATE LOCATION OF A POST-CLOSURE SPILLWAY SHOWN. TAILINGS DISCHARGE LOCATIONS MAY BE MODIFIED IN LATE STAGE OPERATIONS TO GRADE THE IMPOUNDMENT SURFACE AND FACILITATE POST-CLOSURE DRAINAGE TO THE PERMANENT SPILLWAY.
5. SELECTION OF A DESIGN STORM EVENT FOR STORMWATER STORAGE AND SPILLWAY CAPACITY WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW MEXICO STATE ENGINEER.

DAVID ALAN KIDD — NEW MEXICO — 13778 — REGISTERED PROFESSIONAL ENGINEER — 11-17-10

SCALE: 400 0 400 800 FEET

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE: **TAILINGS STORAGE FACILITY AT FINAL BUILD-OUT**

Golder Associates

PROJECT No.	103-92557		FILE No.	103925574004	
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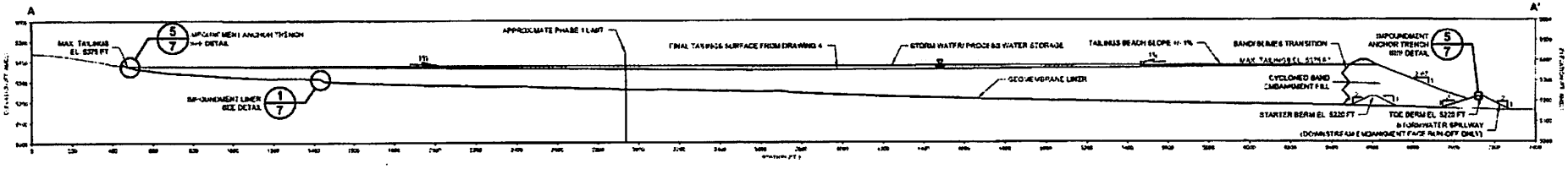
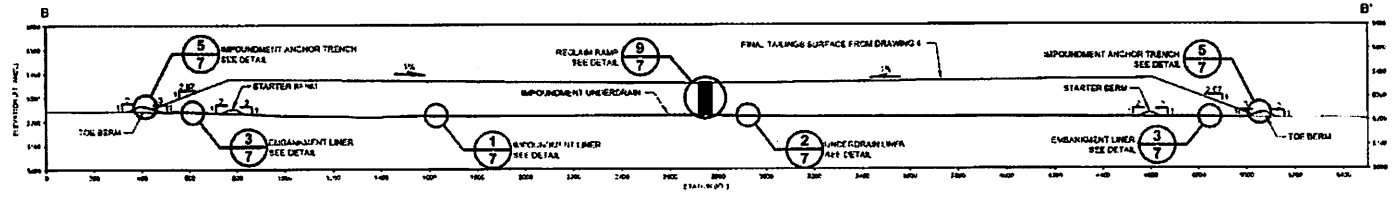
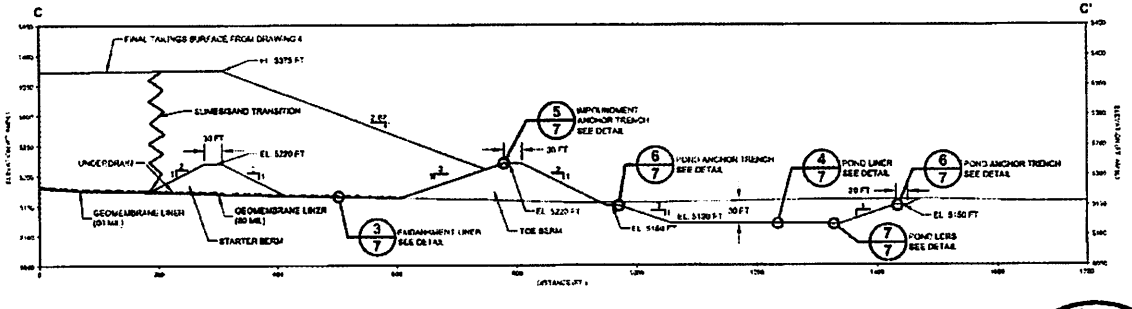


A/5 CROSS SECTION A-A'



B/5 CROSS SECTION B-B'



C/5 CROSS SECTION C-C'

DAVID ALAN KIRD
NEW MEXICO
13778
11-17-12
REGISTERED PROFESSIONAL ENGINEER

DRAWING USE	CONCEPTUAL DESIGN NOT FOR CONSTRUCTION
PROJECT	COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
TITLE	TAILING FACILITY STORAGE CROSS-SECTIONS

Golder Associates

PROJECT No.	103-82557	FILE No.	103825574000		
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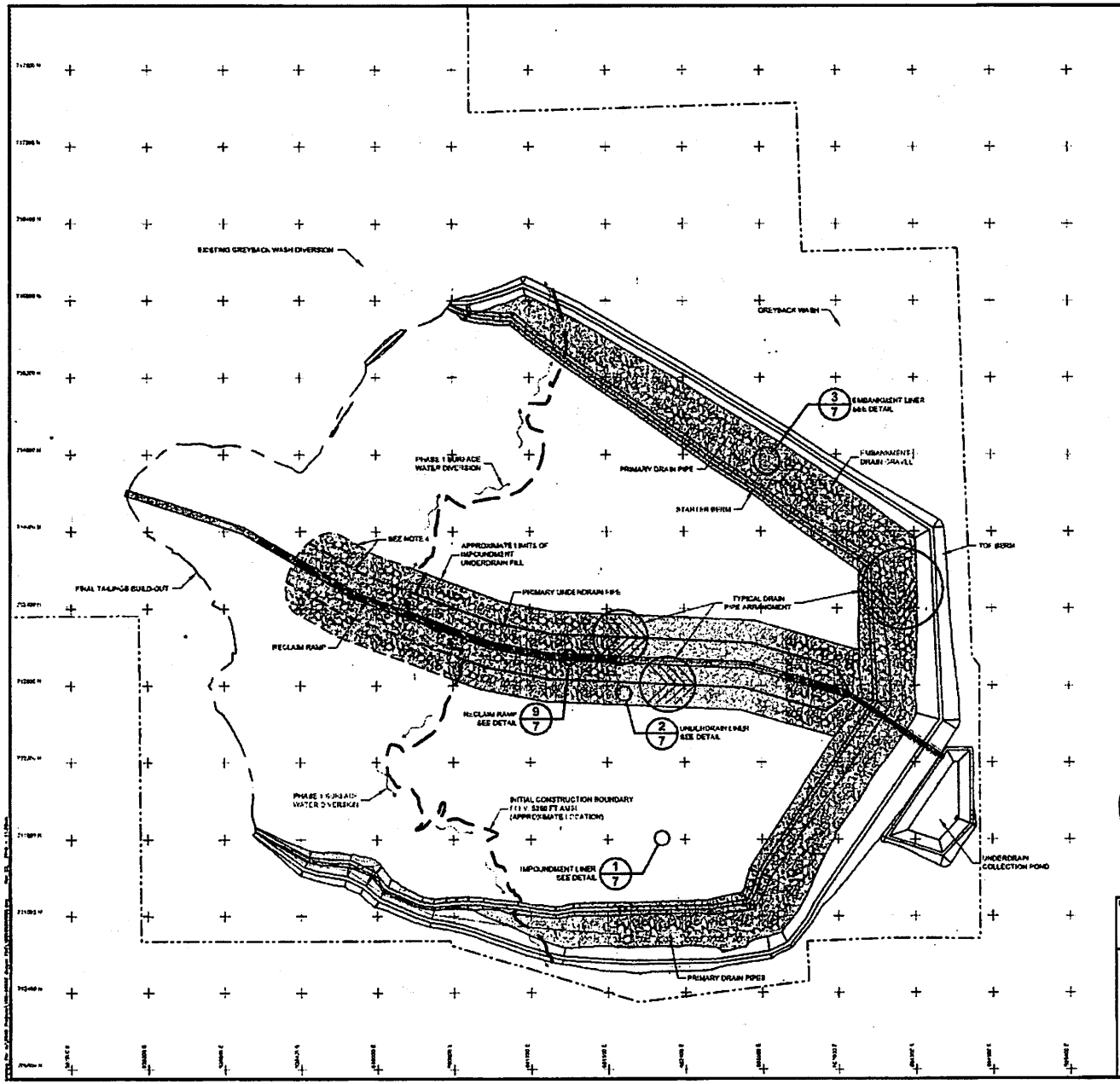

LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PHASE 1 SURFACE WATER DIVERSION FLOW ARROW
- PERMIT BOUNDARY
- PHASE 1 BOUNDARY
- FINAL TAILINGS BUILD-OUT
- PRIMARY UNDERDRAIN PIPE
- PRIMARY DRAIN PIPE
- UNDERDRAIN FILL
- 3/7 DETAIL CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 80 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD)
3. EXISTING 5 FT (1) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION
4. APPROXIMATE LIMITS OF UNDER DRAIN SYSTEM SHOWN. EMBANKMENT UNDERDRAIN WILL BE A GRADED SAND AND GRAVEL DRAIN THAT IS FILTER COMPATIBLE WITH CYCLONED TAILINGS SAND. IMPOUNDMENT UNDER DRAIN WILL BE GEOTEXTILE FABRIC WRAPPED. THE IMPOUNDMENT UNDERDRAIN WILL BE EXTENDED DURING PHASED CONSTRUCTION

DAVID ALAN KIRBY NEW MEXICO 13778 REGISTERED PROFESSIONAL ENGINEER 11-17-10

SCALE 400 0 400 800 FEET

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE: **TAILINGS STORAGE FACILITY UNDERDRAIN PLAN**

Golder Associates

PROJECT No.	103-93557	FILE No.	10383537A006	
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REVIEW	DAK	11/17/10		

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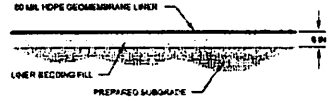
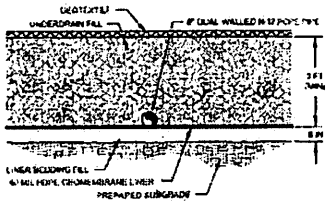


1/7 IMPOUNDMENT LINER DETAIL
NOT TO SCALE



2/7 UNDERDRAIN AREA LINER DETAIL
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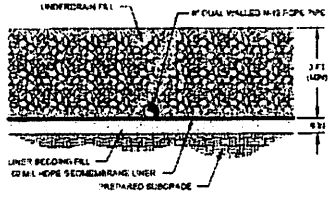

3/7 EMBANKMENT AREA LINER DETAIL
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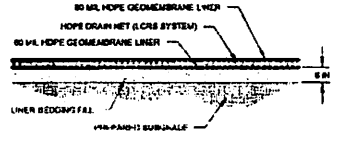
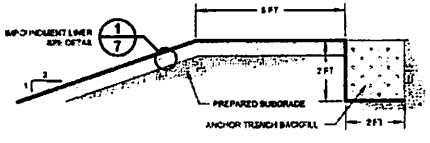
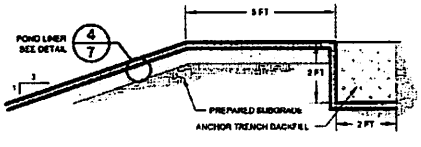


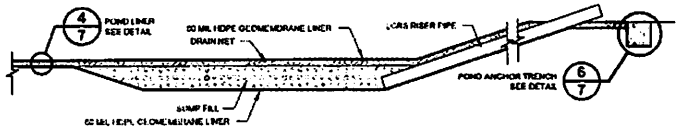
4/7 POND LINER DETAIL
NOT TO SCALE



5/7 IMPOUNDMENT ANCHOR TRENCH DETAIL
NOT TO SCALE



6/7 POND ANCHOR TRENCH DETAIL
NOT TO SCALE



7/7 POND LEAK COLLECTION AND RECOVERY SYSTEM (LCRS) DETAIL
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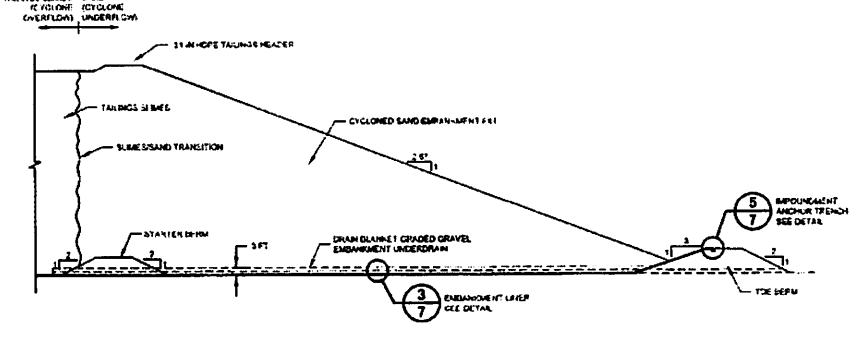
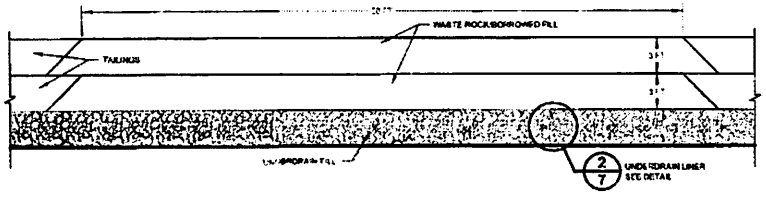


8/7 CYCLONED SAND EMBANKMENT DETAIL
NOT TO SCALE



9/7 PROCESS WATER RECLAIM RAMP DETAIL
NOT TO SCALE

DAVID ALAN KIDD
NEW MEXICO
13778
REGISTERED PROFESSIONAL ENGINEER
11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION	PROJECT: COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
	TITLE: TAILINGS STORAGE FACILITY DETAILS

Golder Associates

PROJECT No.	103-92307	FILE No.	1039253740007		
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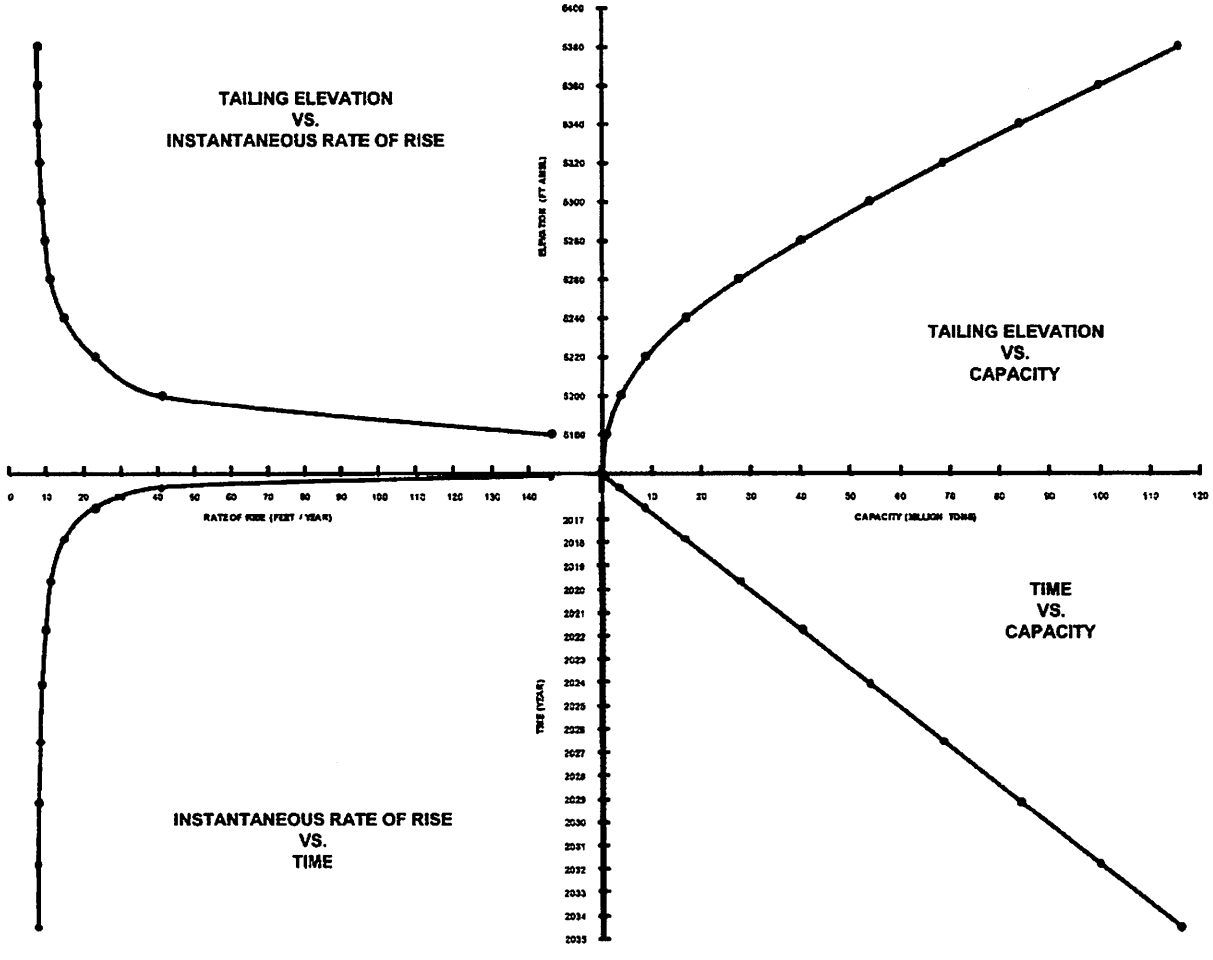
REVIEW	DAK	11/17/10			



NOTES

1. CAPACITY ESTIMATED USING EXISTING FIVE (5) FOOT TOPOGRAPHY PROVIDED BY NEW MEXICO COPPER CORPORATION AND A DRY DENSITY OF 85 PCF
2. TAILING MAXIMUM ELEVATION IS 5,375 FT AMSL AT LOCATION OF DISCHARGE POINT.
3. RATE OF RISE IS CALCULATED FROM THE PRODUCTION RATE OF 17,500 TONS PER DAY AT 91% AVAILABILITY FOR AN ANNUAL PRODUCTION OF 5,840,375 TONS
4. ASSUMED START-UP DATE 2013. ACTUAL START DATE TO BE DETERMINED

DAVID ALAN KIDD
NEW MEXICO
13778
11-17-10
REGISTERED PROFESSIONAL ENGINEER

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE: **HEIGHT VS. CAPACITY PLOT**

Golder Associates

PROJECT No.		103-92357	FILE No.	10392357ACD8
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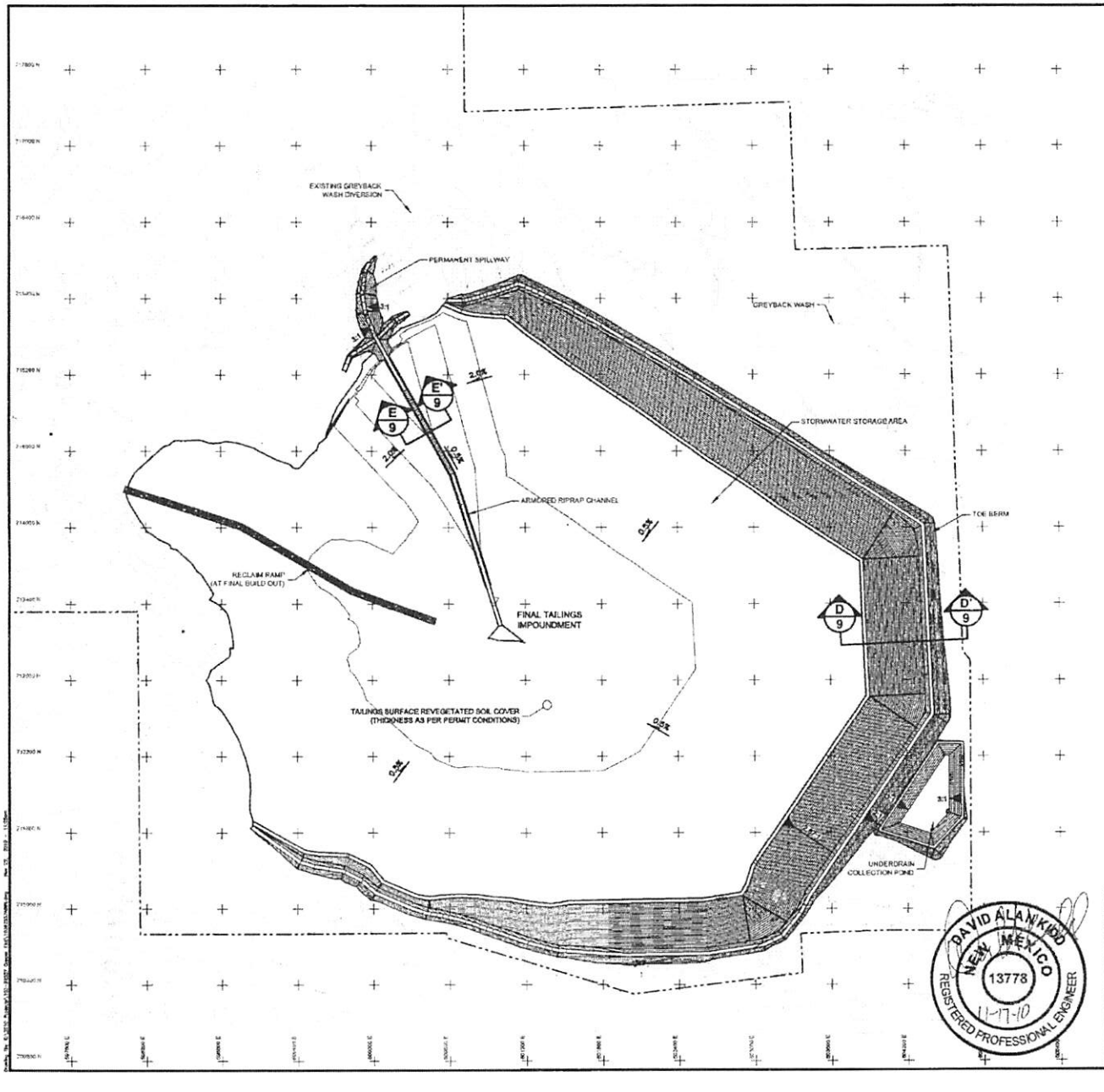
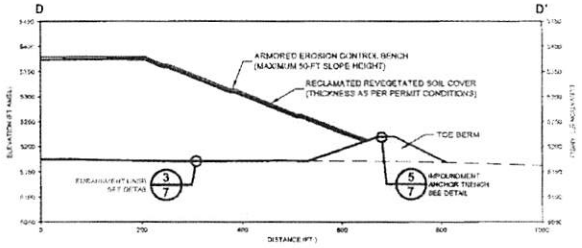
REVIEW	DAK	11/17/10		

19023

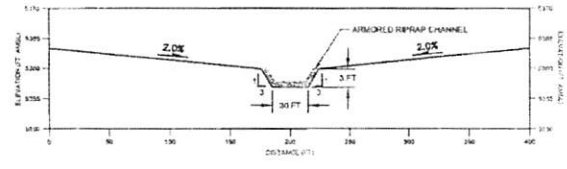
19024





D/9 CROSS SECTION D-D'

SCALE 120 0 120 240 FEET



E/9 CROSS SECTION E-E'

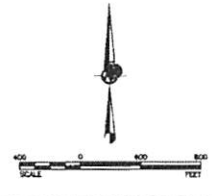
SCALE (x5 VERTICAL EXAGGERATION) 50 0 50 100 FEET

LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PERMIT BOUNDARY
- D/9 CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 95 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NMMMD).
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
4. FINAL EMBANKMENT CREST HEIGHT WILL BE APPROXIMATELY 5,375 FEET AMSL. TAILINGS SURFACE CONFIGURATION SHOWN REPRESENTS CONDITIONS AT THE CESSATION OF MINING OPERATIONS. APPROXIMATE LOCATION OF A POST-CLOSURE SPILLWAY SHOWN. TAILINGS DISCHARGE LOCATIONS MAY BE MODIFIED IN LATE STAGE OPERATIONS TO GRADE THE IMPOUNDMENT SURFACE AND FACILITATE POST-CLOSURE DRAINAGE TO THE PERMANENT SPILLWAY.
5. SELECTION OF A DESIGN STORM EVENT FOR STORMWATER STORAGE AND SPILLWAY CAPACITY WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW MEXICO STATE ENGINEER.
6. TAILINGS SURFACE REGRADED AT CLOSURE OR TAILINGS DEPOSITION PATTERNS MODIFIED DURING LATE STAGE OPERATION TO CONTOUR THE TAILINGS SURFACE.
7. UNDERDRAINING TO BE COLLECTED AND EVAPORATED ON IMPOUNDMENT SURFACE UNTIL UNDERDRAIN PIPES CAN BE PLUGGED AND UNDERDRAIN COLLECTION POND BACKFILLED.



DRAWING USE
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

PROJECT
COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE
TAILINGS STORAGE FACILITY CONCEPTUAL CLOSURE PLAN

Golder Associates

PROJECT No.	103-92557	FILE No.	10392557A009	
DESIGN	CDJ	10/25/10	SCALE AS SHOWN	REV. 0
CADD	ANV	10/27/10	DRAWING	
CHECK	GM	10/29/10	9	
REVIEW	DAK	11/17/10		

THE NOTEBOOK

Hearing Officer

I want to THANK New Mexico Environmental Dept FOR HEARING THE CONCERNS OF THE PUBLIC

I am indeed sincerely & seriously concerned about the OVERWHELMING possibility of environmental pollution if this COPPER mine is allowed to open

I want the New Mexico Environmental Department (NMED) **TO NOT GRANT THIS PERMIT FOR DISCHARGE OF WASTEWATER**
UNLESS
New Mexico Environmental Department is **120%** sure that this mining company
THEMAC (financed out of Australia) called New Mexico Copper Company ***set up*** in Canada,

HAVE PROVEN WITH DETAILED DOCUMENTATION beyond a doubt
THAT THEY INTEND TO
PROTECT OUR SIERRA COUNTY ENVIRONMENT
FROM ANY WASTE WATER CONTAMINATION,

And they Will take every possible precaution
to protect our fragile desert environment
which is stressed to the max right now with serious drought conditions

I've brought to this Public Hearing my **research**
which I began in 2011 and have been doing continuously until now.

Some of MY RESEARCH is included inside this notebook that I will hand in following my comments ASKING THAT MY WRITTEN COMMENTS BE ADDED TO THE PUBLIC RECORD OF THIS HEARING.

MY COMMENTS are focused on the heavy duty plastic liner called an HDPE GEOMEMBRANE liner WHICH WILL BE LAID OUT ON THE GROUND OF THE 547 ACRE TAILINGS STORAGE FACILITY – COMMONLY CALLED 'THE TAILINGS POND' WHICH IS DESIGNED TO HOLD 100 MILLION TONS OF ROCK THAT CAN GENERATE ACID MINE DRAINAGE.

Disappointed to see no explanation for CQA how they plan to ~~PP~~ implement liner

(here I will Name the documents)
NMCC Mining Plan of Operation,
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

→ **Geotechnical "Construction Quality Assurance" (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates**

***United States Environmental Protection Agency Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles**

NEW MEXICO COPPER RULE
TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants,

I WANT ALL OF US TO BE PROUD OF OUR NEW MEXICO ENVIRONMENTAL DEPARTMENT & OTHERS WHO ARE INVOLVED

****

I wanted to make it **easy** for NMED to find this notebook
and I want to provide the **NEW MEXICO ENVIRONMENTAL DEPARTMENT**
with **a few simple symbolic reminders**
that the NMED is **responsible for** protecting & guarding
our New Mexico
AIR, WATER EARTH, WILDLIFE and PLANTS.

MADAM HEARING OFFICER

So, you – our **NEW MEXICO ENVIRONMENTAL DEPARTMENT**
have been designated
– OUR GUARDIAN **BEAR**

Please keep in mind the adage: An ounce of PREVENTION is worth a POUND of cure.
Thank you for hearing my comments and for your sincere and knowledgeable attention to the details of this PERMIT.
Please make a fully informed and cautious decision.

I believe the method/formula used in the Shomaker ..._____
may be outdated and newer formulas may give a more accurate data on any projected theoretical amount of leakage from rips, tears, punctures, perforations of the HDPE Liner. See methods/formulas in doc _____

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

September 24, 2018

Via Electronic Mail
John.baca2@state.nm.us
and Federal Express

Mr. John Baca
Hearings Clerk
New Mexico Environment Department
P.O. Box 5469
1190 South St. Francis Drive
Santa Fe, New Mexico 87502

Re: Discharge Permit (DP-1840) Hearing for Copper Flat Mine

Dear Mr. Baca:

This letter responds to the Notice of Public Hearing for Copper Flat Mine (the "Notice") regarding the hearing scheduled by the New Mexico Environment Department ("NMED") for September 24, 2018 through September 28, 2018 in Truth or Consequences, New Mexico, on the proposed groundwater discharge permit ("Discharge Permit or DP-1840) prepared by the NMED in response to a permit application ("Application") submitted by New Mexico Copper Company ("NMCC") for the Copper Flat Mine in Sierra County, New Mexico (the "Mine").

Texas strongly objects to the Mine and the issuance of the Discharge Permit by NMED. The Application and Notice states that the Mine will discharge over 25 million gallons per day of polluted liquid wastewater (over 100 billion gallons over the life of the Mine) from mill tailings, process water, impacted stormwater and domestic water ("Tailings"). The Application also proposes the discharge of other impacted stormwater, process water, and leachate generated from the Mine's operations in other areas.

As reflected in the attached picture, the Mine is located next to arroyos and natural stream beds that flow directly into the Caballo Reservoir. In its various applications for the Mine, NMCC admits that

the Mine's operations are hydrologically connected to the Rio Grande and Caballo Reservoir. Although NMCC claims that the Tailings will be stored in synthetically lined tailing ponds, there is no assurance that these ponds will not leak, overflow and fail. An example is the recent Animus River spill disaster in Colorado. Approval of the Discharge Permit for the Mine with the location of the Tailings ponds upstream and in close proximity to the Caballo Reservoir is not prudent from an environmental standpoint.

Millions of people in Southern New Mexico and Texas rely on water in the Rio Grande and Caballo Reservoir. A spill of Tailings would contaminate water in the Rio Grande and Caballo Reservoir and would be devastating to Southern New Mexico and Texas. The potential for this kind of disaster outweighs the economic benefits of the Mine.

New Mexico is a party to the Rio Grande Compact of 1938 with Texas and Colorado (the "Compact"). The Compact requires that New Mexico deliver a certain quality and quality of water to Texas. The water in the Rio Grande and Caballo Reservoir below Elephant Butte Reservoir belongs to Texas and is used for delivery to its contract users. The Mine and Discharge Permit will have a substantial and long-term adverse effect on Texas' water in the Rio Grande and Caballo Reservoir. If allowed, these actions violate Texas's rights under the Compact. Texas is currently in litigation against New Mexico in the United States Supreme Court, see Texas v. New Mexico, Original No. 141, regarding Compact violations. Granting the Discharge Permit and allowing the Mine to operate will add to these violations and Texas's damages against New Mexico under the Compact.

Attached are copies of written comments from Texas.

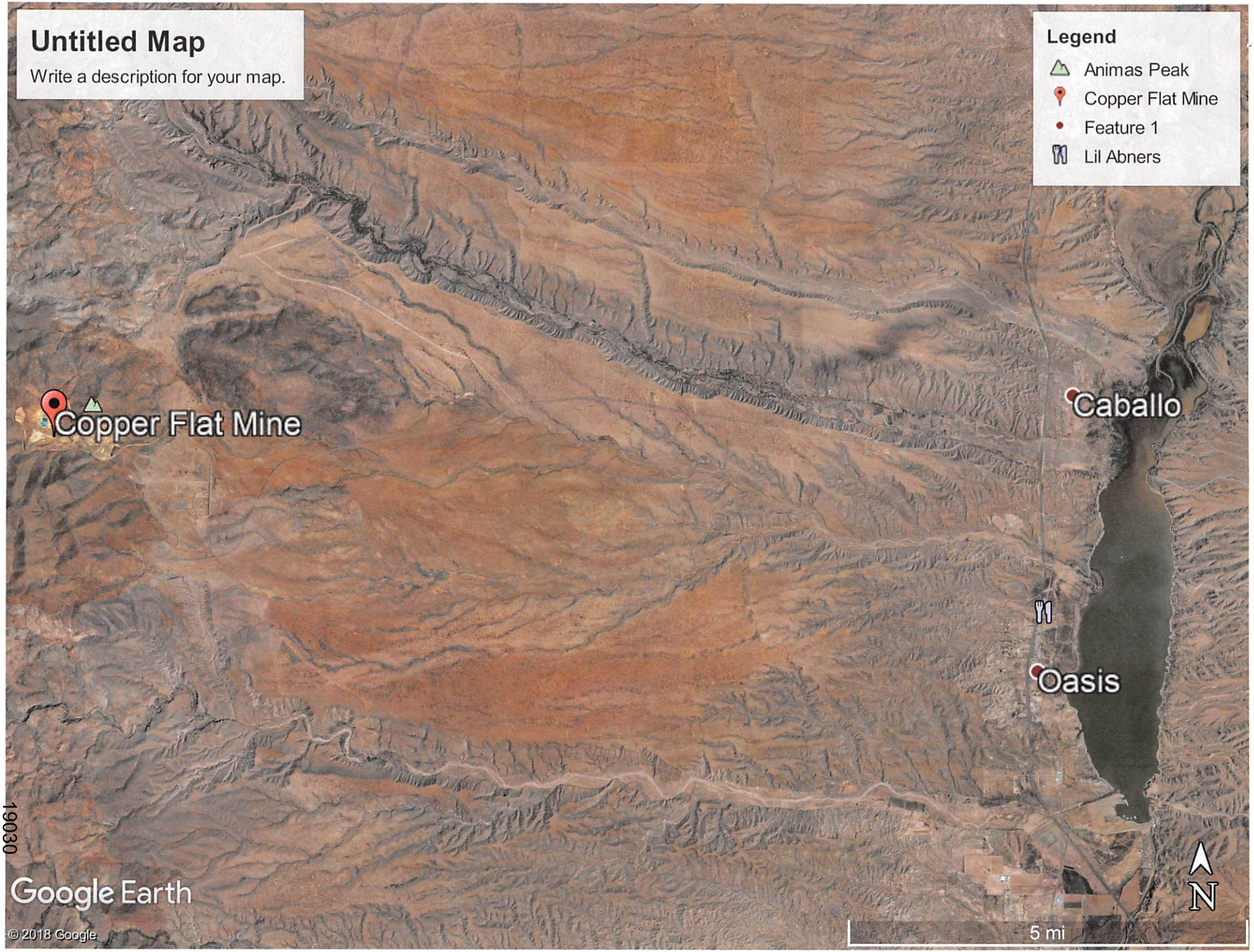
Sincerely,

Pat Gordon

Pat Gordon
Texas Rio Grande Compact Commissioner

cc: Andrew Knight, Esq.
General Counsel, NMED
P.O. Box 5469
1190 South St. Francis Drive
Santa Fe, New Mexico 87502-5469
Andrew.knight@state.nm.us

Mr. Brad Reid
NMED Ground Water Quality Bureau
P.O. Box 5469
1190 St. Francis Drive
Santa Fe, New Mexico 87502-5469
Brad.reid@state.nm.us


Untitled Map
Write a description for your map.
Legend
Animas Peak
Copper Flat Mine
Feature 1
Lil Abners
Copper Flat Mine
Caballo
Oasis
N
5 mi
Google Earth
© 2018 Google
19030

NOTICE OF PUBLIC HEARING
NEW MEXICO ENVIRONMENT DEPARTMENT

The New Mexico Environment Department (NMED) will hold a public hearing beginning at 9:00 a.m. on September 24, 2018, and proceed through September 28, 2018 as necessary, at the Ralph Edwards Auditorium in Truth or Consequences, New Mexico. In the event the hearing is not completed by September 28, the hearing will continue beginning October 9, 2018 and proceed through October 12, 2018 as necessary. The hearing will consider a proposed groundwater discharge permit (Discharge Permit or DP-1840) prepared by NMED in response to a permit application submitted by New Mexico Copper Corporation (NMCC or Applicant) for discharges from the proposed Copper Flat Mine (Facility). The Hearing Officer will provide opportunities for general oral statements or non-technical testimony from members of the public throughout the hearing at breaks in the presentation of technical testimony, and in a public comment session beginning at 5:00 p.m. on September 25, 2018 and continuing as long as there is comment to be given. A Spanish-language interpreter will be available at the hearing.

Name of the Applicant: New Mexico Copper Corporation

Location of the Discharge: The facility is located at 85 Copper Rock Road approximately 5 miles NE of Hillsboro, in Sections 30 and 31, T15S, R06W, Sections 25, 26, 35, and 36, T15S, R07W, and Section 6, T16S, R06W, Sierra County.

Activities Which Produce the Discharge: NMCC is proposing to construct and operate an open pit copper mine and associated mineral processing facilities. Regulated mine units will include an open pit, waste rock stockpiles, ore stockpiles, mineral processing units including a mill and concentrator, process water impoundments, and a synthetically lined tailing impoundment.

Quality, Quantity, and Flow Characteristics of the Discharge: The Applicant proposes to discharge a maximum of 25,264,000 gallons per day (gpd) of mill tailings, process water, impacted stormwater, and domestic wastewater to a synthetically lined tailing impoundment. In addition, discharge of impacted stormwater, process water, and leachate generated from waste rock stockpiles, mine units including a concentrator and associated mineral processing facilities, impoundments, sumps, tanks, and pipelines, and other areas within the permit area would be authorized pursuant to DP-1840.

The Copper Flat Open Pit walls, the waste rock stockpiles, the Tailings Storage Facility and other impacted areas at the mine facility may contain sulfide minerals which, when oxidized, generate acidic solutions. These acidic solutions react with in situ minerals to produce acid rock drainage (ARD) that typically contains total dissolved solids (TDS), sulfate and certain metals in concentrations that exceed the water quality standards of Section 20.6.2.3103 NMAC. Process water and impacted stormwater discharges from the Copper Flat Mine, including ARD, are typically outside the acceptable range for pH and contain TDS, sulfate and certain metals in concentrations that exceed the water quality standards of Section 20.6.2.3103 NMAC.

Depth to Groundwater: Ground water beneath the proposed Copper Flat Mine is at a depth of approximately 7 to 156 feet with a pre-discharge TDS concentration of approximately 317 to 868 milligrams per liter.

Hearing Procedures: The hearing will be conducted pursuant to the NMED Permit Procedures regulations, 20.1.4 NMAC, and the NMED Ground and Surface Water Protection regulations, 20.6.2.3110 NMAC. Any member of the public may attend the hearing and present relevant non-technical testimony, orally or in writing, and examine witnesses testifying at the hearing. To be a party or to present technical testimony, a person must follow the procedures below:

Entry of Appearance Required to be a Party: Any person who wishes to be a party shall file with the Hearing Clerk, and serve upon all other parties of record, including NMED and the Applicants, an *Entry of Appearance* on or before **August 24, 2018**.

Statement of Intent to Present Technical Testimony Required: Any person who wishes to present technical evidence, data, or testimony at the hearing shall file with the Hearing Clerk and serve on the Applicants, NMED, and all other parties of record a *Statement of Intent to Present Technical Testimony* on or before **August 24, 2018**, pursuant to 20.6.2.3110.C NMAC. A timely filed Statement of Intent shall be considered an Entry of Appearance. The Statement of Intent must comply with the requirements in 20.1.4.300 NMAC and 20.6.2.3110.C NMAC and shall include: (1) the name of the person filing the statement; (2) a statement as to whether the person supports or opposes the proposed permit; (3) the name, address, affiliation, work background, and educational background of each witness; (4) the estimated length of direct testimony of each witness; (5) a list of exhibits to be offered into evidence at the hearing with a copy of each exhibit that is not already part of the Record Proper; (6) a list of all technical materials, including information where the material can be obtained, relied upon by each witness in making a technical statement of fact or opinion and an explanation of the basis for such an opinion; and (7) the full written direct testimony of each witness including any opinions to be offered by such witness and an explanation of the basis for that opinion.

Failure to file a timely Entry of Appearance or Statement of Intent to Present Technical Testimony shall preclude a person from being a party to the proceeding and from presenting technical testimony, but shall not preclude a person from presenting a general written or oral statement or non-technical testimony in the proceeding.

Final Determination on Permit by NMED: The Secretary of NMED will make a final determination approving, conditionally approving, or disapproving DP-1840 based on the administrative record for the permit application, public comment, and the public hearing.

Documents Filed with Hearing Clerk: All documents that need to be filed with the Hearing Clerk shall be submitted to: John Baca, Hearing Clerk, NMED, P.O. Box 5469, 1190 St. Francis Drive, Santa Fe, New Mexico 87502, (505) 827-2430.

Documents Served on NMED: All documents that need to be served on NMED shall be sent to: Andrew Knight, NMED Office of General Counsel, 1190 South St. Francis Drive, P.O. Box 5469, Santa Fe, New Mexico, 87502-5469, or andrew.knight@state.nm.us.

Further Information and NMED Contact: For further information on DP-1840 and the public hearing, or to be placed on the facility-specific mailing list, please contact Brad Reid, NMED Ground Water Quality Bureau (GWQB), 1190 St. Francis Drive, P.O. Box 5469, Santa Fe, New Mexico 87502-5469, at (505) 827-2963, or at brad.reid@state.nm.us. The administrative record and the proposed permit can be viewed at the GWQB, and on the NMED website at https://www.env.nm.gov/gwqb/mecs/.

If any person requires assistance, an interpreter, or auxiliary aid to participate in this process, please contact John Baca at (505) 827-2430, or submit a written request to Mr. Baca, at least ten (10) calendar days prior to the hearing at NMED, P.O. Box 5469, Santa Fe, New Mexico 87502-5469, or john.baca2@state.nm.us.

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Part 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, you may contact: Kristine Pintado, Non-Discrimination Coordinator, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855, nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above.

Transcripts of Hearing. Pursuant to 20.6.2.3110.J NMAC, NMED will make an audio recording of the hearing. If any person requests a written transcript or certified copy of the audio recording, the requestor shall pay the cost of the transcription or audio copying.

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

May 17, 2018

Via Electronic Delivery

Mr. Doug Haywood, Project Lead
BLM Las Cruces District Office
1800 Marquess Street
Las Cruces, New Mexico 88005

RE: Comments of the Draft Environmental Impact Statement from the Bureau of Land Management ("BLM") for the Copper Flat Copper Mine

Notice of violation of the Rio Grande Compact

Dear Mr. Haywood:

As the Texas Rio Grande Compact Commissioner, on behalf of the State of Texas, I submit these comments on the Draft Environmental Impact Statement ("DEIS") for the New Mexico Copper Corporation ("NMCC") proposed Copper Flat Copper Mine ("Mine" or "Project"). I understand that the DEIS was published in the Federal Register, Vol. 80, No. 229 on November 30, 2015. I understand the final EIS may be released in the summer of 2018.

Texas only recently became aware of the Mine in a meeting with the Bureau of Reclamation ("BOR") when during the meeting, the BOR informed Texas and Colorado that it had, in 2015, approved a lease contract for the delivery of San Juan Chama Water to the Elephant Butte Reservoir ("EBR") and Caballo Reservoir ("Caballo") for the Apache Jicarilla Tribe.[1]

[1] Texas does not believe that San Juan Chama waters can be delivered by the BOR to Texas as Usable Water under the Compact without agreement of the Rio Grande Compact Commission. No accounting method is in place for delivery to Caballo as Usable Water in Project Storage. Further, the BOR does not have authority to augment deliveries without Compact Commission approval. The statements on page 15 of the John Shomaker & Associates, Inc. Hydrologic Report dated December 2017 that flows from the Jicarilla lease water will arrive at Caballo Dam are not accurate.

Texas is interested in the DEIS because of the effects that the proposed action and the proposed alternatives the Mine will have on the quantity and quality of waters apportioned and delivered to Texas under the Rio Grande Compact, Act of May 31, 1939, ch. 155, 53 Stat. 758 (the "Compact"). The Compact is an agreement between the States of Colorado, New Mexico and Texas which has been approved by Congress. The Compact apportions the waters of the Rio Grande among the States of Colorado, New Mexico and Texas. The apportionment is based on both the quantity and quality of water in the Rio Grande. Under the Compact, New Mexico is required to deliver to Texas its apportioned water from the Rio Grande. New Mexico is required to relinquish control of these delivered waters at EBR, which is above Caballo. The Compact also provides for the delivery of water from the Rio Grande to Mexico under a 1906 Treaty between the United States ("US") and Mexico.

Based upon our review of the DEIS, Texas has serious concerns regarding the Mine's affect upon the quantity and quality of water apportioned and delivered to Texas by New Mexico under the Compact. These concerns include the following:

1. Section 3.6.2.3.3 Summary of Groundwater Assessment of the DEIS states that the "Impacts to the regional water budget, including flows of the Rio Grande, would be significant." It further states that "These impacts would be large in magnitude, long-term, and certain" and that the "Impacts to water levels caused by the supply well field would be significant." [2]

These adverse impacts will have a clear and unmistakable adverse effect on the Compact as well as Texas's apportioned and delivered water under the Compact. Examples of the issues associated with the Mine's adverse impact on the Compact are described in the February 26, 2016 letter from New Mexico's own state agency, the New Mexico Interstate Stream Commission ("NISC"), where the NISC opposed the DEIS based in part on concerns that the diversion would adversely impact Usable Water in Project Storage in violation of the Compact. The NISC also described other significant Compact issues that would be created by the Mine, including storage impacts to the States of New Mexico and Colorado.

The DEIS itself and reports prepared for NMCC by its consultant, John Shomaker & Associates, corroborate that the Mine's operations, with wells situated in close proximity to Caballo, will impact Rio Grande flows and deplete water stored in Caballo.

2. Section 3.6.3 Mitigating Measures of the DEIS states that NMED and OSE (both New Mexico state agencies) have the authority to require mitigation of impacts "that are judged unacceptable in accordance with New Mexico regulations." It further states that "The BLM intends to rely on the State agencies to exercise their statutory authority in determining which impacts exceed allowable limits and what mitigating measures may be required by diversions caused by the Mine." [3]

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[2] The DEIS concludes that the impacts will last over 100 years. See pages 3-59 and 3-60.

[3] The concept that depletions from the Rio Grande or Caballo (water belonging to Texas under the Compact) can somehow be offset with waters below or upstream of the depletion (not in real time) based on New Mexico state law

This, however, is inconsistent with the Compact. Under the Compact, New Mexico is required to deliver annually an amount of apportioned water to Texas.[4] The delivery occurs in EBR in time for each irrigation season. Under the Rio Grande Project ("RGP"), which has been fully incorporated into the Compact, waters (defined as Usable Water in Project Storage) are released from EBR to Caballo for delivery to users (under contract) in New Mexico and Texas. All water in the Rio Grande released from EBR, including water stored in Caballo, is Texas's apportioned water delivered by New Mexico under the Compact. This water is for the exclusive use of Texas for delivery to users (under contract) in New Mexico and Texas.

In 2013 Texas sued New Mexico and joined Colorado in the United States Supreme Court for violating the Compact. See Texas v. New Mexico, Original 141. The US intervened in the lawsuit against New Mexico. The Court appointed a Special Master to prepare a report. As stated in the Special Master's report, "New Mexico must relinquish all control over the water delivered to Texas." Therefore, any diversion of Texas's water in the Rio Grande and Caballo for the Mine violates the Compact. The Compact does not provide that New Mexico (under its state law) can "offset' or "pay back" Texas for waters delivered to Texas under the Compact.[5] Once the water is delivered by New Mexico to Texas at EBR, New Mexico must relinquish all control over the water and further must not take any action to divert or interfere with Texas's water to be delivered to its contract users.[6]

The DEIS assumes that under New Mexico state law, the impact to the Rio Grande and Caballo will we made whole by the New Mexico OSE as it determines under New Mexico State law. Even assuming New Mexico State law would apply, the Application for diversion filed in January 2018 which the OSE assumes that water under the Jicarilla lease will be used to offset any adverse impacts to the Rio Grande and Caballo does not come close to offsetting damages to the basin as referenced in the DEIS. The lease between NMCC and the Jicarilla is for 15 years, and is only based on when water is available. The lease also expires when the New Mexico OSE on its own decides further offsets are not required. The Mine is estimated to operate for approximately 12 years, but the damages to water basin (including the Rio Grande and Caballo) will be for over a 100 years.[7]

The US is a party to the Compact and is responsible for ensuring compliance by Colorado, New Mexico and Texas. This was unanimously confirmed by the United Supreme Court in its opinion decided on March 5, 2018 in which it recognized a significant role for the US in protecting the RGP as well as the integrity of the Compact. The Court further noted that

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and should not apply to waters delivered by New Mexico to Texas under the Compact. These delivered waters are not subject to New Mexico state law, which may permit exchanges or offsets among upstream its water users.

[4] The Compact also requires that the water be of a certain quality.

[5] There is no assurance for any offset. The lease provides for San Juan Chama only if available. As stated by the NISC, any meaning offset would have to be on a "real-time" basis.

[6] Even if possible, any offset would be downstream and would not mitigate actual upstream depletions to the Rio Grande and Caballo. Further, offsets would not be in real time.

[7] See pages 3-59 and 3-60 of the DEIS.

the US "as a sort of agent of the Compact" was charged with ensuring that the Compact's equitable apportioned waters were delivered to contracting parties in Texas and New Mexico.

Based on the Court's opinion, the BLM, as an agency of the US, should not simply delegate Compact obligations to a New Mexico state agency "to exercise their statutory authority in determining which impacts exceed allowable limits, and what mitigation measures may be required." This is not a state issue. Any adverse impact of Texas' water in the Rio Grande and Caballo violates the Compact.

3. The BLM has failed to undertake a groundwater basin study recommended by its own DEIS.[8] Page 4-8 of the DEIS states, "Surface Water Use: The Proposed Action and alternatives would reduce groundwater discharge to Caballo Reservoir and the Rio Grande, decreasing surface water quantities there. This impact is expected to have a long-term, large-extent, and probable cumulative effect on these surface water resources. The cumulative magnitude of the effect can only be determined through a comprehensive mid-basin study of Caballo Reservoir and the Rio Grande."

No such study has been conducted. The DEIS has a deficient and obviously glossed over and flawed hydrologic study of the impacts to the basin, including that amounts that would divert Rio Grande river flows and Caballo. The NISC estimates that the Mine would extract approximately 60,000 acre feet of water from the groundwater system and any recovery would come directly from the Rio Grande and Caballo. The NISC expressed concern that the estimates of damages to the water system in the DEIS are suspect and fail to accurately take into account that the recovery could take a hundred years. We concur with the NISC and along with other parties believe that a further supplemental hydrology study of the basin is critical and should be conducted to determine a true and accurate impact to the water basin. This should be done before the DEIS is finalized.

4. In addition to the impact on the quantity of water delivered to Texas under the Compact, Texas in concerned that the Mine will adversely impact the quality of water required to be delivered by New Mexico under the Compact. The DEIS describes the Mine as an open pit mine operation with open trailing ponds in close proximity to Caballo. Any spill or leak from these ponds would have a disastrous environmental impact on Texas's water which is used by farmers in Southern New Mexico and Texas and the City of El Paso.

In summary, the Mine's proposed actions impact Texas's apportioned waters in the Rio Grande and Caballo that have been delivered by New Mexico to Texas, which violate the Compact. BLM has failed to do a supplemental comprehensive groundwater basin study as stated in the DEIS to determine the magnitude of these impacts. The DEIS improperly delegates the responsibility to protect Texas under the Compact to a New Mexico State agency. The Compact does not allow New Mexico to divert and then allegedly offset (or put back) waters that belong to Texas under the Compact. Texas will not be protected as stated in the DEIS. As confirmed by the USSC is its recent unanimous decision, the US as an agent for the Compact is responsible for ensuring that Compact water deliveries are made to Texas. Your DEIS violates your duty to Texas.

[8] See pages 4-8 of the DEIS, which recommends a supplemental study of the basin.

We request that the BLM reconsider its position under the DEIS and take a closer look and evaluate the obligations that the US owes to Texas under the Compact.[9] We also believe supplemental studies to the basin should be conducted.

If you have questions, we are available to meet to present our concerns.

Sincerely,

Pat Gordon

Pat Gordon
Rio Grande Commissioner,
State of Texas

cc: David Bernhardt, Deputy Secretary of Interior

Senator John Cornyn

Tom Blaine, New Mexico Compact Commissioner
Tom.Blaine@state.nm.us

Kevin Rein, Colorado Compact Commissioner
kevin.rein@state.co.us

Maria O'Brien, General Counsel, EP#1
mobrien@modrall.com

Samantha B. Salopek, General Counsel, EBID
samantha@h2o-legal.com

Edward Drusina, PE, United States International Boundary and Water Commissioner
Ed.Drusina@ibwc.gov

Stuart Sommach
ssomach@somachlaw.com

[9] The US owes and obligation to protect Colorado and Mexico as well.

RIO GRANDE COMPACT COMMISSION

PATRICK R. GORDON
TEXAS COMMISSIONER

401 E. FRANKLIN AVE., STE 560
EL PASO, TEXAS 79901-1212
TELEPHONE: (915) 834-7075
FAX : (915) 834-7080

April 12, 2018

VIA ELECTRONIC MAIL AND
FIRST CLASS MAIL

Mr. Tom Blaine
New Mexico Compact Commissioner
Office of the State Engineer
P.O. Box 25102
Santa Fe, New Mexico 87102

Re: Application for Permit to Appropriate – New Mexico Copper Corporation ("NMCC") – Notice of Violation of Rio Grande Compact

Dear Commissioner Blaine:

Texas has recently been informed that an Application for Permit to Appropriate 5,234 acre feet of water (the "Application") by NMCC is in the process of being approved by New Mexico. The Application states that this water is needed by NMCC for the operation of a mine ("Mine") located close to the Rio Grande and Caballo Reservoir.

The Draft Environmental Impact Statement ("DEIS") for the Mine and the Hydrology Report prepared by John Shomaker & Associates, Inc. dated December 2017 reflect that the Mine will have a direct, large in magnitude, and long term impact on Compact water delivered by New Mexico to Texas in the Rio Grande and stored in Caballo Reservoir. The New Mexico Interstate Stream Commission ("NMISC") confirms this in a letter dated February 26, 2016, objecting to the DEIS. I wanted to put you on notice of Texas's concerns.

New Mexico is a party to the Rio Grande Compact, see Act of May 31, 1939, ch. 155, 53 Stat. 785 (the "Compact"), along with the States of Texas and Colorado. The Compact apportions the waters of the Rio Grande between the States of Colorado, New Mexico and Texas. The Compact also provides for the delivery of water to Mexico under a 1906 Treaty. New Mexico delivers Texas's apportioned water under the Compact in Elephant Butte Reservoir. At such time, the water belongs to Texas and is only available for use by Texas and certain contract and treaty parties in New Mexico, Texas and Mexico. New Mexico is prohibited from diverting or using Texas's water.

Texas is aware of NMCC's attempts to acquire rights to water that would purportedly offset the impacts to the Rio Grande and Caballo Reservoir. The fifteen year lease that NMCC has with the Jicarilla Apache Nation for San Juan Chama water that New Mexico may require as some type of offset for the diversion of Texas's Compact water would not come close to remedying the immediate and long term depletions to the Rio Grande and Caballo Reservoir caused by the Mine. In fact, NMCC states in the Application that it needs this water to operate the Mine. The DEIS states that the impacts to the Rio Grande and Caballo Reservoir will last over 100 years. A "so called" fifteen year offset that New Mexico calculates in its sole discretion does not remedy the harm to Texas that will be caused by the approval of the Application, even assuming as stated by the NMISC that such offset was in "real-time."

As you are aware, Texas sued New Mexico in the United States Supreme Court, see Texas v. New Mexico, Original No. 141. This case is currently before the Court and is moving forward toward trial and resolution, following the Court's denial of New Mexico's motion to dismiss. Discovery will commence soon.

The NMCC proposed actions and the granting of water rights by your office will directly and adversely impact Texas. New Mexico's approval of this action, as well as granting permits for other actions (such as the Gillis pump immediately below the Caballo Reservoir), are violations of the Compact. These ongoing violations reinforce Texas's action in the United States Supreme Court and add to its recoverable damages against New Mexico.

Sincerely,

Pat Gordon

Pat Gordon,
Texas Commissioner

cc: Kevin Rein, Colorado Compact Commissioner
Hal Simpson, Federal Chairman, Rio Grande Compact Commission

Pat Gordon

From: Pat Gordon
Sent: Thursday, April 26, 2018 12:57 PM
To: david.ennis@state.nm.us
Subject: New Mexico Copper Corporation (NMCC) - Mining Permit
Attachments: Tom Blaine - Application for Permit to Appropriate NMCC - Notice of Viol....pdf

Dear Mr. Ennis:

I am the Rio Grande Compact Commissioner for the State of Texas. Attached is a letter delivered to Tom Blaine.

I want to reach out and put you on notice regarding Texas's concern and objection to the Copper Flat Mine, especially regarding its impacts relating to the quantity and quality of water in the Rio Grande and Caballo Reservoir, which is water delivered by New Mexico to Texas under the Rio Grande Compact. We believe the draft EIS issued by the BLM has errors and fails to address Compact issues which will damage Texas. Texas also has concerns with NMCC mitigating damages caused by its operations to the Rio Grande and waters in Caballo Reservoir with a lease of San Juan Chama water. Texas will raise further objections if mining permits are considered.

If you have questions, you can contact me at the address below.

Sincerely,

Pat Gordon
Rio Grande Compact Commissioner

Pat Gordon | Partner
4695 North Mesa Street | El Paso, TX 79912
T (915) 545-1133 | **F** (915) 545-4433 | **E** pgordon@eplawyers.com
GORDON DAVIS JOHNSON & SHANE P.C.
EPLAWYERS.COM DISCLAIMER

Pat Gordon

From: Pat Gordon
Sent: Thursday, April 26, 2018 1:01 PM
To: brad.reid@state.nm.us
Subject: FW: New Mexico Copper Corporation (NMCC) - Discharge Permit
Attachments: Tom Blaine - Application for Permit to Appropriate NMCC - Notice of Viol....pdf

Dear Mr. Reid:

I am the Rio Grande Compact Commissioner for the State of Texas. Attached is a letter delivered to Tom Blaine.

I want to reach out and put you on notice regarding Texas's concern and objection to the Copper Flat Mine, especially regarding its impacts relating to the quantity and quality of water in the Rio Grande and Caballo Reservoir, which is water delivered by New Mexico to Texas under the Rio Grande Compact. We believe the draft EIS issued by the BLM has errors and fails to address Compact issues which will damage Texas. Texas also has concerns with NMCC mitigating damages caused by its operations to the Rio Grande and waters in Caballo Reservoir with a lease of San Juan Chama water. Texas will raise further objections if discharge permits are considered. We believe any discharge will have an adverse impact on waters delivered to Texas.

If you have questions, you can contact me at the address below.

Sincerely,

Pat Gordon
Rio Grande Compact Commissioner

Pat Gordon | Partner
4695 North Mesa Street | El Paso, TX 79912
T (915) 545-1133 | F (915) 545-4433 | E pgordon@eplawyers.com
GORDON DAVIS JOHNSON & SHANE P.C.
EPLAWYERS.COM DISCLAIMER

BEFORE THE NEW MEXICO SECRETARY OF ENVIRONMENT

IN THE MATTER OF THE HEARING ON THE APPLICATION FOR DISCHARGE PERMIT 1840 BY NEW MEXICO COPPER CORPORATION TO DISCHARGE MINING TAILINGS AND OTHER WASTE WATERS AT COPPER FLAT MINE	DOCKET NO. 8WB-18-06 (P)

Max Yeh's Comment in Opposition to DP 1840

I am a 30-year resident of Hillsboro, New Mexico, where Copper Flat Mine is located, and I am opposed to the granting of Discharge Permit 1840 authorizing New Mexico Copper Corporation to discharge "25,264,000 gallons per day" of mining wastewater, which "may contain water contaminants or toxic pollutants elevated above the standards of Section 20.6.2.3103 NMAC," and which "may move directly or indirectly into ground water of the State of New Mexico" at the Copper Flat Mine site. [GWQB, Draft Discharge Permit 1840.]

I ask the Secretary not to grant the Permit for the following reasons:

The Discharge Permit DP 1840 should not be granted because the application for a Discharge Permit is frivolous.

A. It is frivolous because the applicant, New Mexico Copper Corporation [fully owned subsidiary of THEMAC Resources Group Ltd.], does not have the financial means to construct and operate Copper Flat Mine.

1. In its June 2017 audited financial statement, NMCC's parent company Themac Resources, shows a cash balance of $128,471 (cad), a liability of $83,807,040 (cad), no visible signs of income, and the auditor, Davidson and Co., LLP, opined without qualification:

a. "Without qualifying our opinion, we draw attention to Note 1 in the consolidated financial statements which describes conditions and matters that indicate the existence of a material uncertainty that may cast significant doubt about THEMAC Resources Group Limited's ability to continue as a going concern."

2. Not having the financial means to develop the mine, none of the conditions of the permit can be fulfilled.

B. The application is frivolous because the applicant, NMCC, does not have sufficient water rights to operate the mine according to its MORP or to reclaim the mine upon closure since the reclamation of the pit depends on more water than it can access.

1. The Expedited *Inter Se* suit within the Lower Rio Grande Adjudication adjudicating the water rights claims of NMCC and Harris Gray and William Frost, owners at the time of the water rights NMCC intends to use for mining Copper Flat Mine, granted a total of 861.84 afy for mining operations. See the Subfile Orders and Judgments for Subfiles LRO-28-008-9009 and LRO-28-008-9010 in the Lower Rio Grande Adjudication, 2/28/18. As of August 1, 2018, NMCC is full owner of those rights.

2. NMCC claims to need over 6,000 afy to operate. It has sufficient water rights to operate less than 2 months every year.

3. Reclaiming the pitlake requires 2,200 to 2,800 af of water. It will take 2.5 to 3 years to backfill the pitlake, making it a slow and not rapid refill. Since this type of reclamation of the pit allows NMCC to avoid contouring the steep pit walls to a reclaimable slope angle, the speed with which the pit is filled is crucial to avoiding pit wall deterioration. The advantages of a water reclamation are lost and may not be beneficial to the environment. Without an idea of how much water might be available, there is no way to estimate the benefits of a water filled pit as compared to some other reclamation of the pit.

C. The application is frivolous because Copper Flat Mine is a marginal mine which can operate profitably only under extremely rare conditions, so that NMCC's 11-year plan of operation has no merit at all.

1. Copper Flat ore is very low quality ore, containing roughly half as much copper as the ore at Chino near Silver City and about 1/5 the quality of average copper ores around the world. Therefore, mining Copper Flat is comparatively expensive and extremely vulnerable to copper prices and other fluctuating economic conditions. NMCC's feasibility studies show a need for $3.00/lb copper prices to operate profitably. But average copper prices in the last 118 years is $2.50/lb and no 11-year period in history has ever seen copper prices, corrected for inflation, continuously above NMCC's needed $3.00/lb. Therefore, it is extremely unlikely Copper Flat Mine will be in operation for any sustained period of time.

2. If 11 operative years cannot translate into 11 continuous years of mining, then all the calculations for reclamation are mistaken. Projections of pitlake water quality are erroneous. TSF reclamation calculated to be complete in the 39th year will be wrong. All calculations need to be done for an extended and intermittent period of mining.

The Secretary should not grant permits to frivolous applications because doing so harms the public welfare.

A. The corporate and financial organization of NMCC ensures that NMED will be working on this permit endlessly because NMCC seems to be part of a system created to lose money for tax benefits. It is returning 9% tax benefit to its Australian owner for money expended to permit Copper Flat Mine. Meanwhile, this frivolous application is a sinkhole for taxpayer money and the energies of NMED.

1. NMCC is a wholly owned subsidiary of Themac Resources, a Canadian registered company owned by Kevin Maloney, one of the richest people in Australia. Themac Resources has

no income. It and NMCC spend money on loan from Kevin Maloney's Tulla Resources. The loan carries a contractual interest of 20%, a usurious rate in some states. Themac Resources cannot pay the interest on the loan, so 20% of the loan every year can be deductible from Mr. Maloney's taxes as an unmitigated loss. See Themac Resources's website for verification. The highest tax bracket in Australia is 45%. Therefore, the deduction is worth a 9% savings on taxes in that bracket. This is a fine permanent investment for which the real costs are paid by New Mexico tax payers and the work of all the federal and state agencies involved.

a. The unpaid 20% interest is carried on Themac Resouces's financial statements as an accumulating increase of debt, from $34 million (cad) in 2013 to over $84 million (cad) at the present, a debt not taken into account in the 2013 Definitive Feasibility Study and thus making that study rather unreliable. But even that optimistic but now obsolete study (see Section 22.11 and Table 22.7) shows the operating mine's Net Present Value, a balance of costs and income, dropping to 0 when the copper price drops to $2.24 per pound as demonstrated by Professor Lloyd Barr in his comment to the BLM on the Draft EIS. Considering the ongoing 20% interest simply pushes that value higher, making economic feasibility less likely.

B. While granting the permit seems to cause no harm if no mining occurs, it makes the Copper Flat Mine marketable, and it is not the function of NMED to expend its time, resources, and energy, not to mention taxpayer money, increasing the value of private property. The state's Constitution forbids the state from selectively enriching private individuals, and the Water Quality Act, NMSA 74-6, does not authorize NMED to issue a discharge permit to increase the worth of a defunct copper mine.

1. Since NMCC filed the application for a Discharge Permit knowing it did not have either the financial means or the water rights to operate a mine, the application's intent is questionable. Since Themac Resources has been actively trying to sell the mine for some years [see Themac's press release on its website announcing the Letter of Intent to sell the mine to a Chinese company in 2016], the knowingly frivolous application must be considered a means of marketing the mine. Granting the Permit, therefore, turns the Permit into itself a commodity, setting a pernicious precedent.

C. Granting the Permit without actual operation also continues indefinitely the delay in mitigating the groundwater contamination which has been unabated for decades as a result of the previous mine operation.

D. Even though New Mexico law does not have a "can and will" rule, it is recognized that applicants for permits from governmental agencies need to apply in good faith. Colorado expresses its understanding that frivolous applications are a public harm by requiring applications for water rights to make a proper showing of the intent and ability to carry out a water project, and that the project "will be completed with diligence and within a reasonable time." [15 C.R.S. 1990 §37-92-305 (9)(b)] Nothing prevents the Secretary from applying a similar criterion for preventing waste and favoring efficiency.

1. Statements in the application which claim the mine will operate 11 years or that the mine will fast-fill the pit at reclamation are deliberate misrepresentations of reasonable expectations. The application can be denied on that basis by law. And given the company's financial situation, at the least, the Secretary should require a Disclosure Statement according to NMSA 74-6-5.1A.

The Permit should be denied because of internal flaws.

A. NMCC's fast-fill method of reclaiming the pitlake violates the New Mexico Constitution, wherein (XVI, 3) the right to use water is **limited** to beneficial use. To use approximately 2,800 af of water to avoid having to reclaim the steep pit walls or to properly reclaim the pit by earthen refill or to avoid regulatory standards of pollution is not beneficial use of water. To create a large, chemically polluted body of water is not a beneficial use of water. To waste this much water – when the 2018 Draft New Mexico State Water Plan cites insufficiency of water supply as the major water problem the state faces and the 2016 Regional Water Plan for Socorro and Sierra Counties documents this insufficiency in coming years for Sierra County where the mine's located – will irrevocably harm the people's welfare and violate the public's interest, the water being permanently lost through evaporation. If the water were used to dilute polluted water so that it could be used beneficially, the filling of the pitlake might be allowed, but here the dilution is temporary, and eventually the pitlake will be polluted, as is the present pitlake.

1. Justifying this wasteful use of water as part of the beneficial use of mining has no lawful merit. First, the use is post-closure, after productive mining has ceased. Second, and more important, the usage is peripheral to actual productive use, a distinction defined in numerous court cases. In *State ex rel. Martinez v. McDermett*, 120 N.M. 327, § 13, the New Mexico Court of Appeals distinguishes productive agricultural use – meaning to grow crops - from peripheral uses such as using water to soften land to prepare it for plowing. The same distinction is made in *Hennings v. Water Resources Dep't.*, 622 P. 2d 333 (Or. 1981). In *Blaine County Inv. Co. v. Mays*, 291 P. 1055 (Idaho 1930), the court decided that to preserve soil moisture by using water during the winter to form an ice cap over the soil was not a beneficial use of water but a waste. In *Joslin v. Marin Mun. Water Distr.*, 429 P. 2d 889 (Cal. 1967), the Supreme Court of California sitting in bank declared the use of water at a mine to transport gravel and sand was an unreasonable and unlawful form of beneficial use of water. The denial of peripheral uses of water as beneficial use has a solid base recognizable in New Mexico. See *United States v. Alpine Land and Reservoir Co.*, 697 F. 2d 851, 854 (9th Circ. 1983) ("We do not deny or overlook the differences in water law among various western states. However on the point of what is beneficial use the law is 'general and without significant dissent.'") (citing 1 Waters and Water Rights § 19.2 (R. Clark ed., 1967).

2. Before proceeding to permit, the NMED should seek an opinion from the legal branch of the OSE as to the legality of wasting water in New Mexico.

B. NMCC had originally planned to divert impacted storm water into the tailing pond, but now the impacted storm water is to be kept in three impoundments (SW-A, B, C) and the water used in processing (see Draft Permit, fig. 3). NMCC does not have any rights to use surface water. This aspect of the Permit violates NM water law.

C. Because HDPE is considered only resistant and not proof against water penetration, all normal use of HDPE liners includes an under-drain system and a detection system underneath the primary liner. However, the design of the tailings pond (TSF) moves the drainage system above the HDPE liner. The change violates NMAC 20.6.7.22A(4)(d)(v) requiring a "tailings seepage collection system." The above liner system is simply to recover water for reuse and does not protect against contaminant penetration into groundwater. It is not an "under drain."

1. Using a gravel bed for the liner in the TSF instead of a compacted clay bed allows leakage (expected) to leach into the ground. The Copper Rule, then, requires the use of a surround of wells and pumps to pump contaminated groundwater back to the tailings pond. NMAC 20.6.7.22A(4)(c) on interceptor system.

a) Since the TSF area is already contaminated, the Copper Rule mandates the use of an interceptor system from the inception of the use of the TSF.

b) NMED needs to see the design of that system, the number, depth, and location of wells, the studies that show that the wells will recover all the contaminated water moving, and most importantly, proof that NMCC has the water rights to pump the groundwater in sufficient quantity to make the interceptor system work.

D. Monitoring wells for the TSF are insufficient on the south side, where between GWQ-12 and PGWQ-19 is a gap of 1/3 mile.

E. The center-line construction method for the TSF dam is a compromise and not the Best Management Practice. As with the upstream construction method, the upstream side of the dam has no solid base but rests on old tailings, and neither the stability analysis nor the subsidence study covers that weakness.

F. The avoidance of NMAC 20.6.2.3101pollution standards and federal pollution standards in the future pitlake by building a ledge of BLM property so that the water is kept entirely on private land is mere trickery and should be responded to as trickery.

1. The ledge of BLM property will be 3 feet above the equilibrium level of the future pitlake. But a 100 year storm event of 3.73 inches in 24 hours will raise the pitlake level over 3 feet (using a run-off area of 306 acres) and a storm event 3 times that (the safety factor used for the TSF) of 26 inches in 72 hours, will raise the lake level by 31 feet and not evaporate off for 6 months or more. The larger numbers are justified by the fact that the pitlake will be there ad infinitum, and thus experience many 100 year storms and more. The pitlake, therefore, cannot be permanently exempt from either federal or state pollution standards. See NMSA Water Quality Act 74-6-12C. And, even when there is not an exceptional storm event the effects of 22 acres of polluted water are not confined to private property because of the effects on wildlife, so that the state's exemption does not apply.

G. The pitlake is also allowed exemption from NMAC 20.6.2.3101 pollution standards because it will be a "hydrologic evaporative sink" by 20.6.7.33D(1). But this is not necessarily so. The present pitlake has been there for 35 years, and with a calculated evaporation of 34.45 afy, it should be dry by now if evaporation were <u>greater</u> than inflow (the legal definition). Obviously the water has reached an equilibrium level at which inflow <u>equals</u> evaporation. It is by legal definition (which is not necessarily a hydrological definition) not to be considered a hydrological evaporative sink since evaporation is <u>not greater</u> than inflow. Since the future pitlake is conceived to also be at an equilibrium level, it also will not fit the legal definition of an evaporative sink, and further, whenever the humidity is high and evaporation low or whenever it rains, that evaporation will be less than inflow. That is to say, equilibrium level for the future pitlake is based on annual averages of

precipitation and evaporation rates. Actual levels vary from day to day, and similarly, whether evaporation is greater than inflow varies also.

1. Reclamation of a mining pit by backfilling with water is not a normal procedure in mining. Treating the pitlake as an evaporative sink has been tried in West Australia, but not in the way planned by NMCC. The pit is first earth filled to a level below the equilibrium level of the evaporative sink, and then the water is introduced to the equilibrium level. In West Australia, as in New Mexico, water is too precious to use for a complete backfill of the pitlake. NMCC's plan is wasteful of water. See Exhibit I, Clinton Mccullaugh, Genevieve Marchant, Jorg Unseld, Michael Robinson, Benjamin O'Grady, "Pit Lakes as Evaporative 'Terminal' Sinks: An Approach to Best Available Practice Mine Closure," Edith Cowan University, ECU, 2012 (online) (originally published in Proceedings of International Mine Water Association (IMWA) Symposium 2012, pp 167-174). In the United States, backfilling the pit with earth to the original contours is required of all coal mines regulated by the federal rules. All hardrock mines in California are required to backfill pits with earth at reclamation. Many contemporary mines backfill the pit with earth at closure. Proper reclamation of the pit should be backfilling with earth rather than water.

H. The Existing Waste Rock Stockpile-1, at the west side of the pit, is to be removed and water from that area channeled to Greyback Arroyo, but this rock pile has been leaching contaminants for over 35 years. After removal of the pile, the contaminants will be drained into a naturally intermittent stream. This contamination of surface water is not permissible.

I. The Permit cannot be approved without an adequate Reclamation Plan. The submitted Reclamation Plan does not address the following issues:

1. Since the TSP area is already contaminated from mining 36 years ago, the Copper Rule mandates an interceptor system from initiation of mining. How will this system operate after closure? Will monitoring at the monitoring wells below the TSP be continued at the same frequency?
2. If an interceptor system is not in place at closure, who will construct one if the monitoring detects contamination below the TSP dam during active evaporation?
3. Once the HDPE liner is ripped, will monitoring continue below the TSP. How will contamination plumes thereafter be mitigated? Who will do the work and who will pay for it?
4. While application projects no contaminants in the pitlake, there is some doubt about this, especially since the pitlake is left as a permanent feature of the landscape. Should it become contaminated (and twice the present pitlake has become naturally acidic, due probably to rainfall), what will be the mitigation? In 100 years? Is this left to the NMED to handle?
5. Proposed sureties do not seem to imagine or to cover expenses for any possible complexities. Who will pay for them, since fines for groundwater contamination are limited to $10,000 per day, hardly sufficient for a major cleanup.

Max Yeh
P.O. Box 156
Hillsboro, NM 88042
September 16, 2018

EXHIBIT I

2012

Pit lakes as evaporative 'terminal' sinks: an approach to best available practice mine closure

Clinton Mccullough
Edith Cowan University

Genevieve Marchant

Jorg Unseld

Michael Robinson

Benjamin O'Grady

Pit lakes as evaporative 'terminal' sinks: an approach to best available practice mine closure

Clint D. McCullough[1,2], Geneviève Marchant[1], Jörg Unseld[1,3], Michael Robinson[4], Ben O'Grady[5]

[1]*Golder Associates Pty Ltd, West Perth, Western Australia 6005, Australia*
[2]*Mine Water and Environment Research Centre (MiWER), Edith Cowan University, 270 Joondalup Drive, Joondalup, Western Australia 6027, Australia*
[3]*Current address: FMG, Perth, Western Australia, Australia*
[4]*Birla Nifty Copper Operation, Perth, Western Australia 6000, Australia*
[5]*Mount Gibson Mining Ltd, West Perth, Western Australia 6005, Australia*

Abstract

Pit lakes may form when open cut mining operations extend below groundwater level and then fill at cessation of mining and associated dewatering operations by ground and surface water influx. Pit lake hydrogeology may function as an evaporative "sink" when pit lake water evaporation rates exceed influx rates. Although not ideal closure, management of local surface and groundwaters contaminated by Acid and Metalliferous Drainage (AMD) through entrainment toward an evaporative terminal pit lake may provide a best-case scenario for protection of regional water resources required by typical mine closure time scales of hundreds to thousands of years.

We present two case studies from Western Australia; the first where closure of above ground landforms such as waste dumps by covers would arguably not be successful over long terms (1,000 years or more) and another where Potentially Acid Forming waste (PAF) management is limited by current waste rock dump location and suitable cover materials.

Pit lake water balance modelling indicates both case study pit lakes will function as hydraulic sinks if they are not backfilled above their equilibrium water levels. A best closure outcome for these pit lakes may be to be backfilled with PAF encapsulated with alkaline/neutral waste and then filled as rapidly as possible to minimise PAF oxidation and ensure an evaporative sink pit lake is formed.

Keywords: backfill, groundwater sink, closure, pit lake, AMD, through-flow, evaporative sink

Introduction

Due to operational and regulatory practicalities, pit lakes will continue to be common legacies of mine lease relinquishments. Pit lake water quality is often degraded by Acid and Metalliferous Drainage (AMD) which may lead to acidic water with elevated metal concentrations (McCullough 2008). Degraded water quality reduces pit lake environmental values and may present risks to surrounding communities and environmental values (McCullough and Lund 2006). Mine closure guidelines and standards increasingly require chemical safety and low risk to surrounding ecosystems for long-terms for closure practices to be acceptable (ANZMEC/MCA 2000; ICMM 2008; DMP/EPA 2011).

Unplanned or inappropriate management of these novel geographical features can lead to both short- and long-term liability to mining companies, local communities, the government and the nearby environment during mining operations or after lease relinquishment (Doupé and Lymbery 2005).

Nevertheless, most developed jurisdictions are consistent in their requirement for mining companies to plan and/or rehabilitate to minimise or prevent entirely any potential deleterious effects of the pit lake water body on regional ground and surface resources (Jones and McCullough 2011). The focus of most general or *ad hoc* pit lake regulation is given to protecting human and ecological communities from effects of the pit lake. For example, in Australasia, closure guidelines are based on ANZECC/ARMCANZ (2000) criteria; generally for ecosystem protection requirements. Such guidelines generally emphasize either a demonstration of null-negative effects of the lake or require management to achieve the required level for compliance (Kuipers 2002). AMD treatment may be very costly and difficult to achieve in many remote mining regions. As a result, sustainable pit lake management aims to minimise short and long term pit lake liabilities and maximise short and long term pit lake opportunities (McCullough et al. 2009).

Pit lake water balance in an arid climate

Climate is the single most important factor on the hydrologic processes associated with a pit lake (Castendyk 2009). Changes in climate (e.g. temperature, rainfall, wind, precipitation amount and distribution) will affect the individual hydrologic components differently. In general, surface hydrologic processes (e.g. direct precipitation, evaporation, surface water runoff) are defined by regional climate. Groundwater inflows are generated from precipitation recharge and tend to buffer short-term climatic changes, but long-term climatic changes will be reflected in groundwater inflows over the long-term. Modelling of groundwater and climate processes is often used to predict final water balances in pit lakes (Vandenberg 2011).

Post-closure pit lakes in an arid environment are typically classified as either "through-flow" lakes or "evaporative sinks" (Niccoli 2009). Evaporative sinks may occur in arid climates where the evaporation potential is higher than average rainfall runoff. During groundwater cone-of-depression rebound and pit void filling, the pit lake water level rises to a level where inflows (rainfall, runoff and groundwater inflow) are in equilibrium with evaporation losses. Hence, pit lake water level does not rise to levels higher than adjacent groundwater levels and water is not released to the environment (Figure 1). The water quality of evaporative sink lakes is expected to show increases in acidity, metals and salt concentrations over time through accumulation of solutes introduced through groundwater inflows, surface catchment run-off and direct rainfall to the developing lake's surface.

Backfill is often recommended to avoid many issues associated with poor pit lake water quality developing from weathering of PAF material in the pit void and pit lake walls (Puhalovich and Coghill 2011). If backfill volumes and distributions are small enough to permit accumulation of water above the backfill, then this use of the pit void as a waste rock or otherwise dump will remove these waste materials

from the typically higher rates of weathering and transport encountered when placed above ground. However, the pit backfill volumes and/or placement will cause pit lake surface area reductions and alter the pit lake hydrological balance. Decreased net evaporation may then lead to the pit lake changing from a evaporative sink lake to a through-flow type. If the water quality in the pit lake is poor, this contaminated water may be released into the environment through seepage into the regional groundwater system.

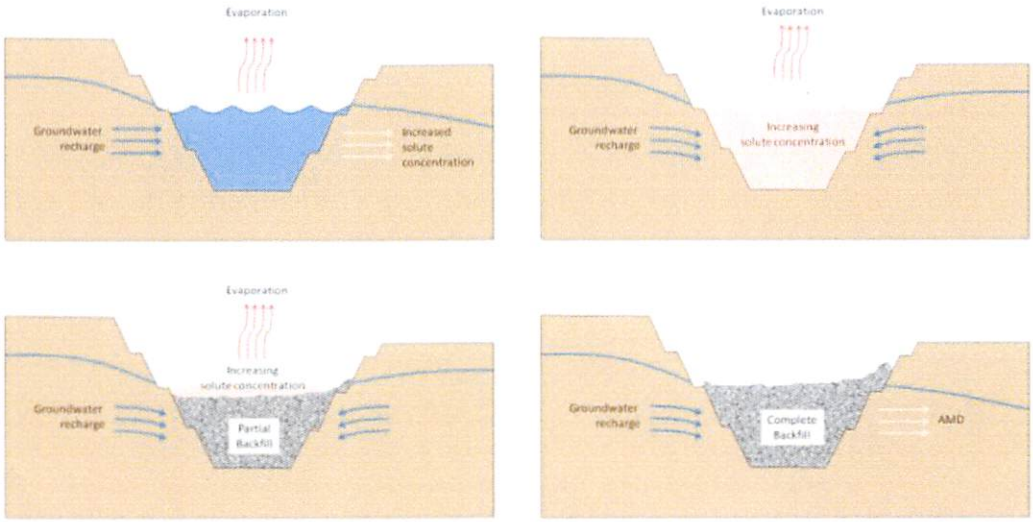

Figure 1 *Generalised potential hydrogeological regimes for pit lakes in an arid region.*

Case studies

Although there are many examples for successful dumping of mine waste under wet covers or at the bottom of pit lakes (Schultze et al. 2011), we present two case studies from semi-arid and arid Western Australia that will be relevant to many other arid/semi-arid parts of the mining world e.g., south-west US, South Africa, etc. (Figure 2). Both operations are currently working towards development of detailed mine closure plans but face difficulties with Potentially Acid Forming waste (PAF) management in above ground waste landforms where armouring and waterproof waste cover materials are lacking in their regional environments which instead primarily consist of highly dispersive clays and sand. Geochemical testing indicates both pit lakes are likely to develop AMD affected water quality over time.

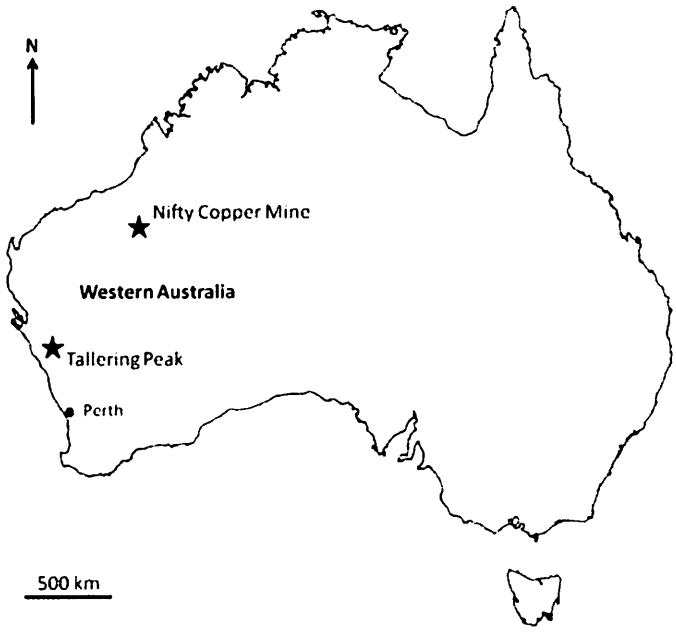

***Figure 2** Location of case studies in arid Western Australia.*

Both operations' pits are expected to fill with water naturally when pit dewatering ceases at closure due to the accumulation of groundwater inflow and rainfall, however, the equilibrium lake elevations depend on the hydrogeology setting and the long-term climatic characteristics in the region. Total inflows into the pit lakes are expected to gradually decrease as the open pits fill while total outflows are expected to increase due to increased evaporation from an increasing lake area. At some stage, total inflows would approximate total outflows and the water level in each open pit will reach equilibrium, albeit responding dynamically to changes seasonal precipitation and evaporation rates. Water level fluctuations are expected as a result of occasional cyclones.

If the steady-state pit lake elevation remained lower than the surrounding groundwater surface, the pit lakes will remain an evaporative sink within the confines of the open pit with no water release into the environment through groundwater decant. However if the final pit lake elevations reach the surrounding groundwater level, the pit lakes would turn into a through-flow system with water release to the environment through groundwater seepage which could than spread potential contaminant plumes to environmental receptors.

Modelling

A water balance model for each of the closure scenarios was then modelled using the GoldSim Monte Carlo simulation software package. Golder assessed three post-closure scenarios for both of the case-study open pits: pit not backfilled and a pit lake forming, pit partially backfilled to below pre-mining groundwater levels with consequently shallower pit lake forming; and, pit backfilled to above water table, no pit lake forming.

Pit lake hydrological inflows were defined as direct rainfall, groundwater inflow and run-off (catchment and pit walls). Outflows were defined as evaporation from

lake surface, groundwater seepage (if any), and overflow (if any) and climate change predictions were accounted for (**Figure 3**).

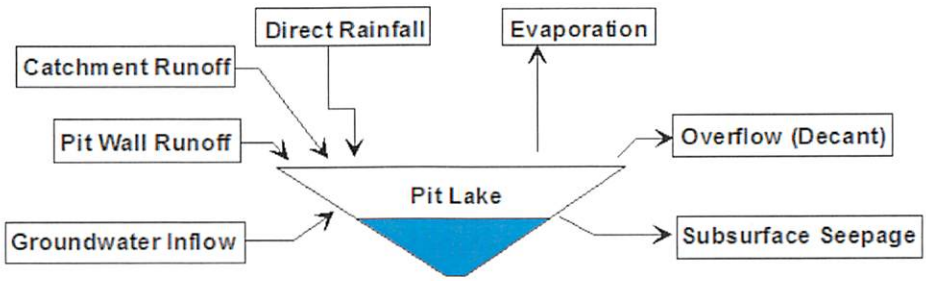

Figure 3 *Conceptual pit lake process flow diagram.*

Nifty Copper Operation, Aditya Birla

Nifty is located in the Pilbara region of Western Australia approximately 1,200 km nor-north-east of Perth (Figure 2). The Pilbara experiences an arid climate with two distinct rainfall patterns. In summer, rainfall occurs from either tropical cyclones or thunderstorms, while the winter rainfall is typically from low pressure trough systems. Average annual rainfall is low and varies in the region from 200 mm to 420 mm (Kumar et al. 2011; Kumar et al. 2012) .

The open pit scenario with no backfill was identified as an evaporative sinks. The partially backfilled scenario shows that the equilibrium water level would be more than 10 m higher than the elevation of the backfill material which would then be submerged at pit lake water level equilibrium. The partially backfilled scenarios was identified as developing an evaporative sink. The fully backfilled scenario indicated that the pit would become a through-flow system with water contained in the pit will seep into the groundwater system. If the PAF material already contained in the pit leached chemicals harmful to the environment, this closure option may be present a significant risk at mine closure.

A partially backfilled option was based on the proposed volume of backfilled material provided by the mining company at the time which would reach an expected elevation. This model showed two main consequences to site AMD management at mine closure if the pit was backfilled above equilibrium groundwater level:

1. Reduction in evaporative losses from the absence of pit lake forming would likely lead to a through-flow scenario where groundwater quality would likely be strongly influenced by the geochemistry of pit backfilled material. As the proposed material was predominantly containing PAF, it is therefore likely that water quality would be impacted by AMD as it flows through the pit waste backfill. Due to the through-flow nature of the backfilled pit, the water would then be released to the environment through groundwater seepage, leading to increased risk of negative effects on local and possibly regional groundwaters.
2. If waste landforms are not provided with an effective cover system to reduce infiltration and if the pit lake did not form due to groundwater levels after cone rebound remaining below final pit void backfill surface levels, then this may

also affect the transport of contaminants arising from other above-ground waste landforms. In this scenario, AMD leachate from waste rock dumps containing PAF would enter the vadose zone (area of unsaturated ground above the water table) but would not be transported in the local groundwater plume toward the groundwater sink lake. Instead the AMD plume would be transported by the regional groundwater system and potentially surface water receptors such as groundwater dependant ecosystems of seasonal lakes, creeks and wetlands.

Tallering Peak Iron Ore Mine, Mount Gibson Mining

Tallering Peak iron ore mine is located in the semi-arid Midwest mining region of Western Australia (Kumar et al. 2012), approximately 300 km north of Perth. The Tallering Peak Operation commenced production in 2004 and is predicted to continue operations until 2013.

A partially backfilled option for the T5 pit was based on a proposed volume of backfilled PAF material and assumed the backfill material would be placed in the bottom of the pit and not end dumping from the edge of the pit. After closure, the partially backfilled mine void is expected to fill mostly through groundwater inflows. The final pit lake would be above the backfill, covering the PAF material. Oxidation rates of the PAF material might then be significantly reduced because of the much lower oxygen diffusion rates through water. A final evaporative sink would also entrain AMD contaminated waters away from sensitive environmental receptors such as a nearby ephemeral creek which flows into the Greenough River.

Based on the results of the above analyses, the open pit with no backfill and the partially backfilled scenarios were identified as likely evaporative sinks. The fully backfilled scenario was predicted to be a through-flow system and would therefore be likely to introduce AMD into the groundwater system. While an evaporative sink is unlikely to introduce leachable compounds into local groundwater system, a through-flow system from up-gradient to down-gradient toward a seasonal creek line in the south-west is probably. Furthermore, there was only 5% chance after 35 years that the fully backfilled pit water level would rise high enough to decant to nearby surface waters.

Conclusions

Mine closure is increasingly recognised as a whole-landscape development exercise which must take into account all closure landform elements and how they will interact over time (McCullough and Van Etten 2011). Both of these case studies present strong arguments that completely backfilled pit may not be the best solution to risks presented by pit lakes at mine closure, when long-term effects of climate and above ground closure landforms risks are also considered.

The water quality of evaporative sink lakes is expected to deteriorate over time through evaporation and the consequent entrapment of solutes. Although not desirable in itself, this water quality deterioration indicates that the pit lake is functioning as it should as an evaporative 'terminal' sink and protecting the surrounding environment from AMD (acid and metalliferous drainage) contaminated waters resulting from waste rock dumps.

In the long term, increasing solute concentrations in the evaporative sink pit lake may result in increasing water density. This concentration change may cause density-driven flow into the surrounding groundwater under certain hydrogeological conditions and should be investigated as part of the risk assessment process for this closure strategy.

Stability of physical and chemical conditions inside the deposited waste and at its interface with the lake environment is the main prerequisite for successful long term storage of waste in a pit lake (Schultze et al. 2011). As such, climate change should be a key consideration in the use of pit lakes 'sacrificially' as evaporative sinks. For example, an increasingly wet climate may lead evaporative sink pit lakes to become through-flow or decant to the environment through other means such as over flow. Similarly, even though mean net precipitation may not change or even decrease in a predicted drying climate, an increase in intense rainfall events such as cyclone frequencies may lead to mobilisation of degraded pit lake waters to the surrounding regional groundwaters following such events.

In conclusion, although proposed as best practice by a number of regulatory and sustainability organisations, fully or partially backfilled pit may sometimes potentially lead to poorer closure outcomes than retaining a pit lake. This example demonstrates both the need for mine closure planning to be considered site-specific and on a case-by-case basis as well as for closure strategies to be founded on good empirical evidence of which water balance and geochemical modelling will be key considerations.

Acknowledgements

Thanks to Hugh Jones (Golder) and an anonymous reviewer for constructive advice.

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Sept 24, 18

Dear NM EID

Comment by Taylor Streit

HC 31 Box 712

Caballo NM 87931

I like living on the frontier. But it has its drawbacks and when there aren't many people around bad things happen to the environment. Such was the case with the Moly Mine on the Red River in northern NM a couple decades ago. There was little opposition but myself and a handful of people--the Concerned Citizens of Questa--went to a lot of these meetings. But molybdian prices stayed high so our work didn't amount to much.

But that was a different time and if a mine was proposed near present day Taos—there wouldn't even be a meeting. Who cares what happens between Array, Hillsboro and Caballo? Those tiny towns are somewhere near the extremely remote Aldo Leopold Wilderness.

In the north I saw a relatively small mine turn into a huge beast that broke all the rules. I watched it devastate the lonely blue ribbon trout fishery of the lower Red River where I made my living. Not that the government didn't lay down the law. The Moly mine was fined what amounted to pocket change regularly.

When the operation pulled out it left a mess. Instead of doing the right thing and cleaning up the vast rubble, contaminated dirt and water, the mining companies fought the superfund process vehemently. And when our superfund committee was given a tour of reclaimed land we burst out laughing at a "reclaimed" slope we were taken to. There was two bushes growing out of a pile of smallish boulders!

We thought this was a joke, but the gal who was showing us around had such a hurt look on her face we realized she was getting well paid to visualize a garden.

The town of Questa's people had many health problems from exposure to heavy metals. These were ongoing problems because when the mine pulled out it left the town's water system bedded in tailings, the air full of nasty white dust in spring winds. The people—who were formally called miners-- all of a sudden were simply "the unemployed". Many were forced to move on from what was their historical homes. And there were lots of social and criminal problems too over the years. Like the 12 unsolved murders that had occurred over the mines tenure.

I have moved to this lonely place in southern NM and don't want to see the same thing happen here. At my tender age I am more interested in catfishing than "hike in" trout fishing. But if I get in shape its possible, because we have the southernmost Rio Grande Cutthroat trout fishery in the world. ((That's our state fish by the way.) the Animas aint much of stream; and it usually dries by the time it gets near the proposed mine wells, but it has a population of Rio Grande cutthroat trout above the Ladder on public land. But when that mammoth well starts a pumpin we can be sure that it will suck on the Animas aquafer so powerfully that it will dry it up even up even up into the Wilderness.

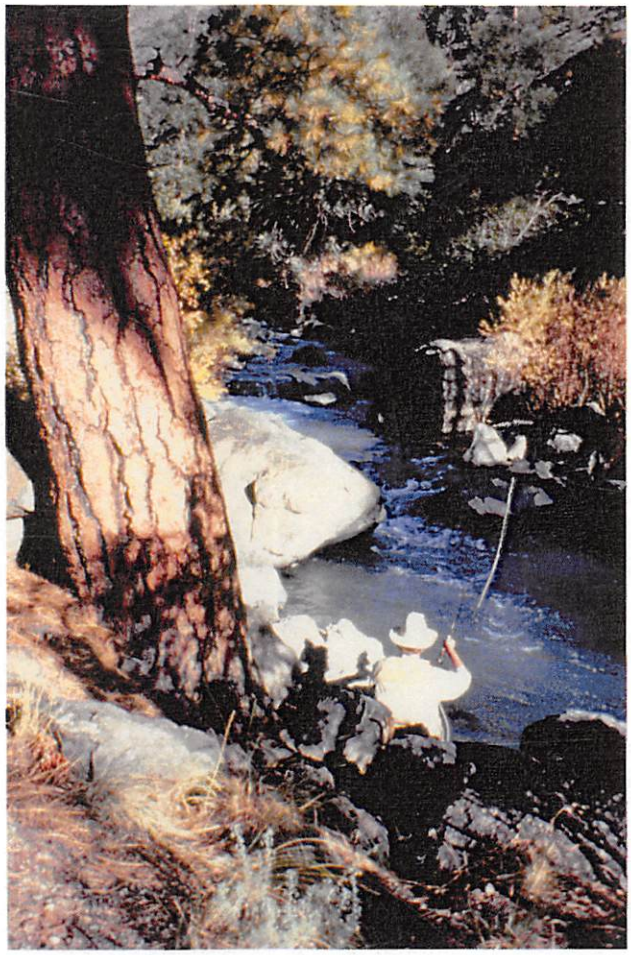
And then there is the downstream element too. Where me and my prized well and two peach trees are. Besides myself there are many other lifeforms: rare Arizona Sycamore, catfish, hatch green chili, pecans, waterfowls, cows, quail, deer, bighorn, farmers and even Texans.

I care what happens to all this life–don't you? But this "you" I speak of is just a few of us, and so we rely on the NM EID to do the right thing and not permit this mine.

This is my comment and I have included two photos from my book **Man vs Fish.** (From the story—Down on the Red.) The rare early photo is from 1980 and shows a clear Red River. The other—and later—

photo shows the blue/gray Red river of today. Which is now considered the standard water quality. As the story sadly points out, I unfortunately, remember a different, clear water Red River.

The clear water of the lower Red River, circa 1980. Photo by Mary Lou Polaski



Note the blue tint of the modern-day Red River.

the reel as fast as possible, giving the fish slack—the idea being that the current would carry the fly line below the ignorant creature, looping below the fish. Theoretically, when the line pulled from the other direction, the fish would lose track of the crafty angler and stop.

It seemed to work—the line went slack anyway—and either I had lost him or he was stopped. But I was on the wrong side of the log; and if our boy was still hooked, he was way downstream. Literally—around a bend I could see through the branches. Anything for such a fish! So I gulped some air, held my nose with one hand and the rod with the other, and under the log I dove. I bobbed back up to the surface and splashed on

Baca, John, NMENV

From: Susie Bussmann <suceppib@gmail.com>
Sent: Monday, September 24, 2018 10:14 AM
To: Baca, John, NMENV
Subject: Docket No. SWB-18-06(P)

Follow Up Flag: Follow up
Flag Status: Flagged

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Dr. Susan Bussmann. My family farm is just 3000 feet north of the of Copper Flat Mine production well field, and I urge you to deny the discharge permit for this alleged mining operation. There is just no way these foreigners will operate this mine for 11 straight years and fulfill the cleanup requirements, bond or no bond. The 10 largest copper mines in the western hemisphere produce more in 11 days than this operation would in 11 years, and when they do go under the fine people of New Mexico will be left holding the bag for the cleanup, as they already have. Just say no, thank you.

Dr. Susan Bussmann

HC31 Box 89

Caballo NM 87931

Baca, John, NMENV

From: Ramona Blaber <monablaber@gmail.com>
Sent: Monday, September 24, 2018 10:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit 1840

Hello Mr. Baca — Is this the correct email address to send written comments to on the Copper Flat Mine permit, and what is the deadline?

Thanks,
Mona Blaber
Sierra Club Rio Grande Chapter communications director
505-660-5905

Baca, John, NMENV

From: Al Webster <awebster.sar@gmail.com>
Sent: Monday, September 24, 2018 11:10 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The ground water, and in fact, ***all*** water, is extremely important for both human and livestock consumption and for agricultural use here in New Mexico. If the water is not fit for those uses it is lost for human use.

The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water the supply even if it does not contaminate groundwater.

Please do not permit the Copper Flat Mine to have any such discharge permit.

Thanks,

Al

Al Webster
Lamy, NM
C: 505.901.2073

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

The draft proposal for the Copper Flat Mine should be denied for a number of reasons. There is inadequate characterization of the bedrock. Mine pollutants would probably not be adequately contained to prevent groundwater pollution.

Water quality standards are not relevantly addressed, and the proposed groundwater monitoring wells are inadequate.

The discharge permit, authorizing up to 25.3 million gallons per day of potentially polluted wastewater is wholly unacceptable. The impact on streams, humans, wildlife and endangered species could be seriously affected by contamination; even the potential risk is unacceptable.

The amount of water needed for the mines use is staggering to even consider in our arid climate. Pumping our precious water resources would adversely drain and damage our ecosystem, local streams, and the Rio Grande. Not acceptable.

NMCC is not a trustworthy steward. They have been cited for numerous violations.

There is no guarantee that the mine would meet the Water Quality Act, and in this time of loosening environmental regulations, I do not trust that any serious enforcement would occur if NMCC failed to comply.

I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

From: Robert McCorkle <frogman3030@gmail.com>
Sent: Monday, September 24, 2018 11:15 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dr. Mr. Baca: I would like my comment to be entered in the record, noting my strong desire to see Copper Flat's discharge permit denied. Allowing 113 million tons of copper tailings to be contained behind a 2-mile sand dam for more than a decade is inviting catastrophe that could adversely impact the drinking water of tens of thousands of us living in the Mesilla Valley. That's a risk not worth taking. Wildlife, too, will be negatively impacted by the polluted tailing pond. Furthermore, the immense quantity of fresh water that would be used in the mining operations for the next decade would be much better used to sustain an ample water supply for agricultural and domestic uses. A front-page story today in the Las Cruces Sun-News noted that due to prolonged drought and lack of snow runoff into the Rio Grande this past winter (the least runoff since the dam was built in the early 20th century), Elephant Butte Reservoir is at 3 percent capacity. Under this scenario, if sustained, the importance of groundwater will be greatly elevated. Allowing Copper Flat Mine to pump 23 billion gallons of water from the aquifer over 11 years is nothing short of insanity. Permit 1840 should be rejected.
Thank you,
Robert McCorkle
Las Cruces, NM

Baca, John, NMENV

From: Michael Madrid <mjmadrid@lcps.net>
Sent: Monday, September 24, 2018 11:16 AM
To: Baca, John, NMENV
Subject: In the matter of Copper Flat Mine's Discharge Permit

Please, please, please don't allow the mining industry to pollute our drinking water! We live in a desert and there are few places where the meme "Water is Sacred" is more applicable than the desert southwest. Our survival in the desert is precariously balanced on the fact that we (I'm including wildlife) rely on clean, safe drinking water.

Please deny Copper Flat's discharge permit. All living things here will thank you.

MJ Madrid

For sale: antique desk suitable for lady with thick legs and large drawers
from Addled Ads in *Anguished English* by Richard Lederer

Baca, John, NMENV

From: Swan Webb <swan.webb@gmail.com>
Sent: Monday, September 24, 2018 11:26 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The proposal to build a copper mine near Hillsboro is absolutely insane for a couple of reasons:

(1) Clean water is one of our most precious natural resources. The Rio Grande watershed is already diminished and and polluted. This would absolutely make the situation worse.

(2) New Mexico is currently being sued by Texas in the US Supreme Court over not delivering enough water to Texas in the Rio Grande. This water use would only make the situation worse.

(3) The Rio Grande Valley in general, and Hillsboro in particular, benefit greatly from outdoor activity, hunting, fishing and tourism. These long-term, sustainable and job creating industries are all threatened by this toxic mine.

Extractive and toxic industry is not the key to New Mexico's future. New Mexico Copper has no right to make life worse on millions of people by taking and polluting our water so they can make a few bucks. Please reject this reckless and dangerous proposal.

Thanks and regards,
Swan Webb
Downriver in Las Cruces

Baca, John, NMENV

From: Walter Bishop <walterjb1@yahoo.com>
Sent: Monday, September 24, 2018 11:29 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Copper Flat Mine knew from the beginning of mining in New Mexico that there would be liquid wastes that they could not process to make it safe to discharge. Now, they want to make their problem to become the citizens of New Mexico's problem.

I say "No."

Walter Bishop
PO Box 841
Elephant Butte, NM 87935
310 686 8336

Baca, John, NMENV

From: Donald Smith <pithouse@outlook.com>
Sent: Monday, September 24, 2018 11:36 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumpedfrom wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water."

Donald H Smith

Baca, John, NMENV

From: Richard Altrock <altrockr@hotmail.com>
Sent: Monday, September 24, 2018 11:39 AM
To: Baca, John, NMENV
Subject: Discharge Permit-1840

I cannot imagine that the department is even considering this horrible permit. This permit should be immediately refused! Any mention of contamination of ground water should cause it to be rejected. If it is accepted, I will call for an investigation into criminal influence.

Richard Altrock, Ph.D.

Baca, John, NMENV

From: JMR <jmr@pwross.com>
Sent: Monday, September 24, 2018 11:45 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

My name and address are as follows:

James Ross

PO Box 16258

Las Cruces, NM 88004

I am Against Permit 1840, Docket No. 8WB-18-06(P)

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Baca, John, NMENV

From: Rob Wilson <gdoldrob@earthlink.net>
Sent: Monday, September 24, 2018 11:46 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

How can we even think of considering approval of this permit after the dry winter and summers we have experienced. Pumping or draining that much contaminate into our precious ground water is totally unthinkable. Don't let it happen. The Rio Grande is under enough pressure as it is; doing more damage to it is unfair to New Mexico and all others down stream.

Robert G. Wilson
Santa Fe

Baca, John, NMENV

From: Rebecca Walding <studio50@swcp.com>
Sent: Monday, September 24, 2018 12:09 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern,
I am appalled to think it is possible for New Mexico Copper to get a permit to dump ANY contaminated waste, let alone into or near New Mexico's water supply. This is a terrible idea with incredibly negative consequences that they are saying is likely to go into the groundwater.

Please, just say "No!"

Rebecca Walding
50 Main Street
Cerrillos, NM 87010
505-474-4931

Baca, John, NMENV

From: Deborah Guerra <guerra.deb@gmail.com>
Sent: Monday, September 24, 2018 1:02 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

New Mexico Copper

The New Mexico Environment Department Discharge Permit-1840

This permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

Dear Email Hearing Clerk John Baca,

Some of the many reasons to reject this permit

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond

will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Debbie Guerra
Silver City, NM
88061

Baca, John, NMENV

From: Nolan Winkler <nolanwinkler@windstream.net>
Sent: Monday, September 24, 2018 1:04 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)
Attachments: hearing statement.docx

I hope to take my 3 minutes at Tuesday's hearing but if something happens I cannot, I am submitting my statement for the NM Environment Department.
Thanks so much,
M. Nolan Winkler (ms.)

In the matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

First I would like to read part of New Mexico's Constitution that I feel is important to granting this discharge permit.

Article 22, Section 21 of the Constitution of the State of New Mexico says, **"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."**

I would ask if leaving 700 vertical feet of steep pitfalls after mining 'protects' the state's beauty or health. This seems to benefit TheMac and NOT the people.

Second, I am confused about letting this Discharge Permit go through at this time as the Australian company that owns the mine has not yet secured enough water to allow it to function more than 1 1/2 or 2 months of a year. If they cannot secure more, that means their 11 years of working time would extend way into the future. My concern is, trying to learn from the history of like mining, would they even be in business so many years down the road. I would ask that this Discharge Permit not even be considered until the mine has secured enough water to function.

Third, I am told the Reclamation Bond of 54 million dollars the mine suggests has not been legally set and I again ask that the Discharge Permit not be considered until a Reclamation Bond is in place.

I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

Baca, John, NMENV

From: Bo Bergstrom <bo.cinesthetic.30.yx@gmail.com>
Sent: Monday, September 24, 2018 1:10 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr Baca:

I oppose this permit for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank for you taking my citizen's opinion.

--Sincerely, Bo Bergstrom, 30 Village Rd., Silver City NM 88061

Baca, John, NMENV

From: Shannon Patrick <xannin2@yahoo.com>
Sent: Monday, September 24, 2018 1:41 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please reject this permit because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you,
Shannon Patrick, MA, M.Ed., MLS
Las Cruces NM

Baca, John, NMENV

From: Edward LeBlanc <el2@twenty15.com>
Sent: Monday, September 24, 2018 2:08 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

After reading about the proposed discharge permit 1840, I had to ask myself if we have lost our collective minds to even consider such a permit!

Coincidently just about a month ago, I showed my 17 year old son some information about the Berkeley Pit and Yankee Doodle tailings pond on the edge of the city of Butte, Montana. Apparently a lot of people thought that was a good idea at first. Now everybody sees that it was clearly a bad idea because it is a superfund site. It is so polluted that it kills birds unfortunate enough to landing on the water.

So that was in 1955, and apparently we have collectively still not learned enough from this and similar atrocities to stop doing this kind of thing. Someone will surely claim that the proposed discharge permit for the Copper Flat Mine is different, perhaps claiming that the "modern techniques" would not cause the same problems, but any such arguments would be naive.

What is being considered is to knowingly permit a future superfund site. This cannot be allowed! It is too dangerous.

With all due respect,
Sincerely,
Edward LeBlanc

531A Dolores St.
Santa Fe, NM
87501
505-471-9176

Baca, John, NMENV

From: Peter Roche <sunmtnsft@aol.com>
Sent: Monday, September 24, 2018 2:16 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to the issuing of the permit in that I think that the mine discharge tailing pond represents an unacceptable risk to the water in the Caballo Resevoir and the Rio Grande for decades to come. Also the open tailings pit will represent a hazard to wildlife for decades or more.

Peter Roche,
Santa Fe, NM

Baca, John, NMENV

From: Sharon Dogruel <dogruel@earthlink.net>
Sent: Monday, September 24, 2018 2:17 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I am very concerned about the permit referenced in that the discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam.

Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. I work with many residents in the Mesilla Valley and know how important water is in this area. Contaminated water would be disastrous for this region and beyond.

This permit will allow discharge from eleven years of mining and will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Granting this permit is wrong and New Mexicans will pay dearly for this mistake if it goes through. You have the authority to halt the discharge permit and prevent a serious environmental catastrophe. Please act responsibly.

Sincerely, Sharon Dogruel

Baca, John, NMENV

From: Susan A Christie <susan.christie1@icloud.com>
Sent: Monday, September 24, 2018 2:22 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

From Susan Christie & Bill Brown
Residents at 905 N Foch, T or C

We are registering our opposition to the Copper Flat Mine's Discharge Permit 1840.
We are totally against going thru this fight again but we are again registering out
total opposition to this permit.

Claims that this will produce continuous jobs are false. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

They will not clean up after themselves. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater. The threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

They require a damaging amount of water. In fact we believe that they are only after the water and do not care about the copper. It is likely that it will destroy environments up into Hillsboro and communities by lowering the water table.

This is our brief but important list of objections to this permit.
Thank you.

To: Butch Tongate, Cabinet Secretary
New Mexico Environment Department
Subject: In the Matter of Discharge Permit 1840 for Copper Flat Mine.

Docket No. 8WB-18-06(P)

Comments Of Charles P. Barrett
Homeowner: 10792 HWY 152, Hillsboro, NM

I own a home that is a scant three miles as the crow flies from the site of the New Mexico Copper Corporation's Copper Flat Mine. I oppose the granting of Discharge Permit 1840 due to the accumulation of serious unanswered questions and concerns that remain after examination of the Draft of the Discharge Permit.

I would like to put these into the record. I believe they are of sufficient scope and weight to require further investigation and substantiation before a valid Discharge Permit could be granted. They are as follows:

1. **The tailings pond liner might leak: interceptor system.**

The material for the liner has been known to leak in other instances of similar application over operational and post-operational time (which is seriously underestimated due to NMCC's undercapitalization and inaccurate projections and surety—see 5 below). If it does there is nothing underneath to catch the leakage. Does that mean the interceptor system has to be in place before the leakage is detected? Has NMED determined that NMCC has the water rights to pump water at that location at the base of the dam?

2. **The tailings pond liner might leak: sufficient groundwater.**

Has NMED seen the design of the interceptor system in sufficient detail to determine whether there is sufficient groundwater at that location to make the system work to capture all contamination?

3. **HDPE liner material degrades**

Is it true in the scientific literature that HDPE is considered not wholly impermeable to water but always leaks at least a little? For example black HDPE that I have used in my garden cracks and degrades in the sun and is clearly not impermeable. Has NMED evaluated this aspect of the liner's potential for leakage over decades?

4. **The Plan for the Tailing Storage Facility (TSF) is Contradictory and Inadequate**

The Draft states that the TSF will be reclaimed after operation by 6 years of "active evaporation" and then 21 years of "passive evaporation," and then covered up and seeded. During the first period, the "under-drain" (which is not an under drain) system is draining the TSF to a pond on the downstream side of the dam (i.e., near the highway) from where the water is pumped back up to the TSF. This is just a continuation of what has been happening during operation, that is, water seeps through the accumulated sediments of the tailings, goes into a layer of sand which has perforated pipes in it to collect and carry the water out under the dam to the drainage pond. It's analogous to a

big "French drain." When the drainage stops after 5 or 6 years, NMCC's plan is to turn off the electricity and sell the pumps and go into the "passive" phase, which only means that the muck in the TSF is left to dry on its own, for 20 years or so before they cover it with dirt and seed it. During the passive phase, the drainage pond will be replaced by a larger evaporation pond (which seems to suggest that water will still be seeping out the bottom of the tailings pond). This plan is unacceptable as it allows seepage in the "passive" phase that could contaminate groundwater.

5. The TSF Reclamation Raises Questions Due To NMCC's Inadequate Operational Finances

In the studies the NMCC presented to the NMED, they continue the assumption that mine operation is 11 years. Following this logically they then say about the TSF reclamation that it will be completed in "year 39." This is contradicted by both the history of the mine and the history of copper prices that would affect the mine which would strongly suggest that they are probably not going to be able to mine for 11 years continuously. NMCC projects that it needs $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 11 straight years of over $3.00 /lb. prices. So the chances are slight that we will see the TSF covered up in 39 years. If the mine takes 20 years to get the copper out, it will be 47 years that those of us who live or own property nearby, as is the case with this commentator, live with the threat of the TSF hanging over the whole Rio Grande valley. In fact, if some blip happens in Themac/NMCC's finances and the company goes bankrupt or if the company just shuts down after taking out the copper, are we left with a permanent contamination issue? After all, Themac/NMCC owns no other property: are they going to stay intact just to reclaim the tailings pond? So, the arrangements for a surety bond are crucial, and that is not yet in place but still being negotiated. NMED should not grant a Discharge Permit until the public gets a look at how we are to be protected.

6. Unanswered technical questions about closure.

How often will the monitoring wells that detect leakage from the TSF be checked after closure? This question arises from the fact that the duration of the reclamation of the TSF is longer than the operating life of the mine. If there is a leakage, an interceptor system has to be activated. Who will do that? Who will pay for that since the cost of these wells and pumps will not be part of the normal reclamation surety. The contamination of groundwater will trigger a fine of $10,000 per day, but that will be insufficient to pay for continuing operation of an interceptor system plus the cost of cleaning up the contamination. What if there is a major break in the HDPE liner or of the dam during active evaporation? What if during the passive phase, the evaporation pond overflows (note that it is near the highway)? That surface contamination will be undetected by the monitoring wells, and even if detected, the protective ring of interceptor wells will be inoperative since the electricity will have been turned off.

7. The Pitlake Reclamation Plan Contradicts Beneficial Use Standard

The question arises as to whether NMCC's fast-fill method of reclaiming the pitlake violates the New Mexico Constitution, wherein under (XVI, 3) the right to use water is limited to beneficial use. To use approximately 2,800 af of water to avoid having to

reclaim the steep pit walls or to avoid regulatory standards of pollution is not beneficial use of water. To create a large, chemically polluted body of water is not a beneficial use of water. To waste this much water – when the 2018 Draft New Mexico State Water Plan cites insufficiency of water supply as the major water problem the state faces and the 2016 Regional Water Plan for Socorro and Sierra Counties documents this insufficiency in coming years for Sierra County – will irrevocably harm the people's welfare and violate the public's interest, the water being permanently lost through evaporation. If the water were used to dilute polluted water so that it could be used beneficially, the filling of the pitlake might be allowed, but here the dilution is temporary, and eventually the pitlake will be polluted, as is the present pitlake.

How can this wasteful use of water be seen as part of the beneficial use of mining and have any lawful merit. First, the use is post-closure, after productive mining has ceased. Second, and more important, the usage is peripheral to actual productive use, a distinction defined in numerous court cases. In State ex rel. Martinez v. McDermett, 120 N.M. 327, § 13, the New Mexico Court of Appeals distinguishes productive agricultural use – meaning to grow crops - from peripheral uses such as using water to soften land to prepare it for plowing. The denial of peripheral uses of water as beneficial use has a solid base recognizable in New Mexico. See United States v. Alpine Land and Reservoir Co., 697 F. 2d 851, 854 (9th Circ. 1983) ("We do not deny or overlook the differences in water law among various western states. However on the point of what is beneficial use the law is 'general and without significant dissent.'") (citing 1 Waters and Water Rights § 19.2 (R. Clark ed., 1967).

Before proceeding to permit, the NMED should seek an opinion from the legal branch of the OSE as to the legality of wasting water in New Mexico.

Baca, John, NMENV

From: Chuck Barrett <amanecer.chuck@gmail.com>
Sent: Monday, September 24, 2018 2:30 PM
To: Baca, John, NMENV
Subject: Comment For Record of Hearing on DP 1840
Attachments: Discharge Permit 1840 Comment.docx

Dear Mr. Baca,

I hereby request that the attached comment document be added to the record of the hearing on DP 1840, Docket No. 8WB-18-06(P).

Thank You,
Charles P. Barrett

Baca, John, NMENV

From: Les Field <lesfield@unm.edu>
Sent: Monday, September 24, 2018 2:43 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern;

As a citizen of the state of New Mexico and the United States, concerned about the scarcity of water in our desert state, concerned about the health and well-being of the plants, animals and people who live here, and appreciative of the natural beauty which I want to see my grandchildren also enjoy, I strong;y oppose New Mexico Copper's plan to discharge 8 billion gallons of horribly contaminated water each year for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars. Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Sincerely,

Les W. Field

Les W. Field

Professor and Chair
Department of Anthropology
University of New Mexico
Albuquerque, NM 87131
Tel #: (505) 277-4524
email: lesfield@unm.edu

Baca, John, NMENV

From: Jan McCreary <mccrearyjan27@gmail.com>
Sent: Monday, September 24, 2018 2:56 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am opposed to allowing Copper Flat Mine to create a polluted pitlake and tailings pond because:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This is unacceptable.

Sincerely,
Jan McCreary

Baca, John, NMENV

From: Daniel Richards <dprichards42@gmail.com>
Sent: Monday, September 24, 2018 4:25 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Attention Clerk John Baca,

This permit is totally unacceptable for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

I trust that the evidence for how destructive to people, wildlife and environment will make denying this permit a forgone conclusion. Please present my comment at the appropriate time in this hearing

Daniel Richards, 42 Chamisa Rd, Mimbres, NM 88049

Baca, John, NMENV

From: Kim Audette <kcaudette@yahoo.com>
Sent: Monday, September 24, 2018 4:47 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir;
I am against permitting the discharge from the Copper Mine in Sierra County

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

5. Keeping in mind the abysmal response of the NM Environmentl Department to the discharge of the Colorado gold mine into the San Juan River, which was a lot smaller at 9 million gallons than this copper pit mine waste pit is, it is impossible for New Mexico to both permit the mine and protect its waters. New Mexico is too incompetent to contain spills in the public interest. Therefore, New Mexico cannot permit pit mines anywhere near any aquifers as a matter of acting in the public interest.

Kim Audette kcaudette@yahoo.com 618 Van Patten 575-740-1988 Truth or Consequences, NM 87901

Subject: On the Hearing before the Secretary of the Environment

In the Matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. *WB-18-06(P)

Background: My name is Ben Lewis. I am a 23year resident of Hillsboro, NM. I am also the current President of the Hillsboro Mutual Domestic Water Consumers Association (HMDWCA). The HMDWCA is organized under the Sanitary Projects Act and has provided potable water to its' members since the early 1960's. The Association is also a litigant in the matter before the NM Court of Appeals regarding the claimed water rights of the Copper Flat Mine (NMCC). I have been authorized by the Association Board of Directors to summarize and convey our comments on the proposed Discharge Permit. We are requesting that our comments be added to the record of the hearing.

Comments: The Association opposes the granting of the requested permit to discharge polluted water from mining operations in to the ground water adjacent to the mine.

- We believe that declaring the proposed pit-lake to be an evaporative sink in order to avoid additional requirements in the reclamation process is risky. While there may be an equilibrium of inflows and evaporation at the current depth of the pit-lake; at the proposed final depth of approximately 250 feet the direction of the flow of water may reverse and become an outflow. This process could also be affected by climatic conditions. We do not believe the water in the lake will meet applicable quality standards and therefore becomes an ongoing risk to the environment. The pit lake will be a permanent feature in the environment with the need for monitoring for the foreseeable future. A safer and more environmentally responsible option for reclamation of the pitlake would be to fill it with waste rock at the end of production. Also, the proposed mine does not have sufficient water rights to execute their preferred reclamation option of doing a "rapid fill" of the pit.
- The current proposed design of the Tailing Storage Facility (TSF) utilizing a single layer of HDPE over a gravel bed is of particular concern. Since HDPE is designated as semipermeable we know it leaks. The gradual construction over time creates a concern of degradation of the material from ultraviolet light, perforation by equipment during construction and the inability to verify the effectiveness of the many joints. The Association recommends that NMCC be required by the Department to construct the TSF using a a clay, not gravel bed underneath two layers of HDPE with a drainage system between the layers.
- We are concerned that the monitoring and interception wells are too far apart and too few in numbers. The proposed quarterly monitoring is too infrequent to be adequate for the intended purpose. Based on our experience over the past 50 or so years that the monitoring wells be tested on a monthly basis. We are also concerned that NMCC does not have sufficient water rights to operate the monitoring and interception wells.
- We have been led to believe that the operating life of the proposed mine is approximately 11 years. What is not clear is this to be construed as 11 contiguous years or many years of intermittent operation. This is important because it has serious implications for monitoring

pollution and maintenance of the mine infrastructure. At what point, this process does the proposed permit become null and void? At what point is reclamation required to commence?

- The proposed mine is based on a marginal ore base and to a great extent on optimistic projections of the price of copper. NMCC has no real roots in New Mexico and no longterm commitment to Sierra County. It is not part of a larger more robust mining operator with a track record of keeping commitments and successfully operating and reclaiming the sites where they operate. It is very much a boutique operation without the resources to withstand the variability of operating environment and economic conditions.
- Finally, we believe that it is premature to consider this application. NMCC does not have the necessary water rights to execute their mining plan. Premature granting of permits can infer greater value to the property and perhaps lead to another transfer of ownership as I have seen several times over the years. It is also the conversion of government permits to private property which is not allowed under the New Mexico constitution.

Baca, John, NMENV

From: Ben Lewis <hillbro48@gmail.com>
Sent: Monday, September 24, 2018 6:12 PM
To: Baca, John, NMENV
Subject: Comments on Draft Discharge Permit Copper Flat Mine
Attachments: HMDWCA Comments on Discharge Permit for Copper Flat Mine.pdf

Please find attached the Association's comments on the above referenced permit. We would ask that our comments be added to the record of the Hearing.

Ben Lewis, President
Hillsboro MDWCA

Baca, John, NMENV

From: John Saridan <john.saridan@gmail.com>
Sent: Monday, September 24, 2018 6:28 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hearing Clerk John Baca,

If this permit is allowed for Copper Flat Mine near Hillsboro NM, it would allow New Mexico Copper Corp. to discharge 24 MGD of contaminated wastewater that can move directly or indirectly into the groundwater. The effluent discharge will be contained in a 600-acre pond behind a 2-mile sand dam. If a break occurs in the retaining dam or its synthetic liner system, it will cause catastrophic damage to surface water and groundwater to the east and south of the mine. It will endanger the Caballo lake and the Rio Grande river and therefore all municipal and agricultural water users in the Mesilla Valley. A threat to citizens, wildlife, agriculture and the economy will occur for many decades past closure, when the 24 billion gallons of wastewater is finally evaporated and the pond area buried. Remember this could have been used for drinking water!

The New Mexico Copper Flat Mine has only enough water rights to operate three months every year. This company projects an 11-year operation. Actually it will mine intermittently for decades. During that protracted period, Copper Flat Mine will remain not fit for use, the polluted pit lake and the pond will be a constant threat to New Mexico wildlife and New Mexico groundwater.

11 years of mining will depend upon approximately 23 billion gallons of water pumped from groundwater wells near the Rio Grande River. This pumping will impair the river's flow, enlarge New Mexico's liabilities in Texas' lawsuit challenging our state's management of the river, and can cost New Mexico taxpayers millions of dollars.

Best Regards,
John and Michele Saridan
3901 Sonoma Springs Ave Unit # 1211
Las Cruces, NM 88011

Baca, John, NMENV

From: KrisK <karpaul@mail.com>
Sent: Monday, September 24, 2018 6:44 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To Whom It May Concern: I would like to state my position as a New Mexico resident that I am totally against approving a discharge permit for the Copper Flat Mine outside Hillsboro. I believe the potential risk to the groundwater is unacceptable. Water is such a precious resource in our state and we need to protect both the quantity and quality of the life giving liquid we still have left. The 24 million gallons per day of contaminated wastewater that will be released if this permit is granted may one day escape into the surrounding groundwater causing pollution that will endanger both people and wildlife possibly for decades to come. It is simply not worth the risk. The permit must be denied!

Kris Karsteadt
3236 Highridge St
Las Cruces, NM

Sent from my iPad

Baca, John, NMENV

From: Chris Spigarelli <eldoradosf@yahoo.com>
Sent: Monday, September 24, 2018 6:52 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello Sir: This permit is a totally NOT environmentally safe or smart idea. As often happens, big business wants to steam roller over safety of the precious life-sustaining water, neglecting to see the results of this huge water waste & dumping the toxins back into the NM water supply. This will endanger the current humans & wildlife plus generations to come. Please take my comments into account...many NM citizens feel the same way, even though they might not comment.

Thank you sincerely, Chris Spigarelli from T or C

Sent from my iPad

Baca, John, NMENV

From: Melody Sears <tunessears@gmail.com>
Sent: Monday, September 24, 2018 8:55 PM
To: Baca, John, NMENV
Subject: For Secretary of the Environment Re: the Hearing on the Matter of Discharge Permit 1840 for Copper Flat Mine

I am a resident of Hillsboro, NM, unable to attend Hearing Meetings due to a previous commitment out of state. I served for four years on the Board of Hillsboro Mutual Domestic Water Consumers Association (HMDWCA) and am extremely concerned about pollution of groundwater from Copper Flat Mine operations if the Discharge Permit is approved by NMED. I currently oppose approval of New Mexico Copper Corporation's application based on the following:

1. The present pitlake is polluted and during NMCC's operation of the mine, should it be permitted to operate, the pitlake waters will also be contaminated. It is my understanding that the NM Copper Rule currently suspends the normal standards of allowable contamination while the mine is operating, but if the mine only operates intermittently, based on variable copper prices, then what will happen with the polluted pitlake water? Is NMCC then required to revert to normal standards of contamination in the pitlake water until mining activity resumes? If not, why not? And if mine operations do not resume within a reasonable time frame (6 months? 1 year?) then is NMCC required to begin remediation efforts? If not, why not?
2. The mine currently has been granted only enough water rights to operate for about 3 months of the year and is involved in an appeal regarding that decision. Nevertheless the discharge permit application is based on NMCC's calculations of discharge and contamination for a mine life of 11 continuous years of operation. NMED would be derelict in its duty if it issues a discharge permit until the appeal mentioned above has been decided.
3. If NMCC were to go into bankruptcy there should be measures in place before being granted a discharge permit by NMED requiring that a fully funded bond or some other surety be established to ensure that remediation of the pitlake and tailings pond will be done within a reasonable time frame (2 years?) despite abandonment of the mine or cessation of operations. Again, NMED would be derelict in its duty if it issues a discharge permit before the appeal mentioned above has been decided and it is clear whether or not NMCC will have enough water rights to operate fully each year for 11 years, which their discharge permit application calculations are based upon.
4. Finally, the existing tailings pond has no HDPE liner and has been leaking contamination into groundwater for the past 35 years. An interceptor system should be required of NMCC and put in place before they begin mining operations, rather than waiting for new monitoring wells to detect new contamination. This requirement must be based on the certainty that NMCC owns sufficient water rights to operate an interceptor system correctly sized for their 11 years of full-time operations.

Thank you for your attention to these concerns.

Sincerely,
Melody Sears
10792 Highway 152, Hillsboro NM 88042

Baca, John, NMENV

From: Adrienne Ross <ahlight@gmail.com>
Sent: Monday, September 24, 2018 9:26 PM
To: Baca, John, NMENV
Subject: "In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)."

Dear Mr. Baca,

I respectfully request that you deny Copper Flat Mine's discharge permit and protect our precious groundwater for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Thank you for your consideration and cooperation on behalf of all New Mexicans.

Sincerely,
Adrienne Ross

Baca, John, NMENV

From: Miranda Roussel <mirandaraven@gmail.com>
Sent: Monday, September 24, 2018 9:53 PM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P).

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

Please reject the permit. My family lives on Animas Creek and they use the ground water for drinking. Please don't let mining prospects threaten my family.
Thank you,
Miranda Roussel

Baca, John, NMENV

From: Barry Hatfield <barryhat@cybermesa.com>
Sent: Tuesday, September 25, 2018 12:39 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Sir,

This permit should be rejected.

New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pit-lake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater -- that once was drinking water -- is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

Thank you,

Barry Hatfield

Santa Fe NM
(505) 473-0695

Baca, John, NMENV

From: deb shekter <dtshekter@yahoo.com>
Sent: Tuesday, September 25, 2018 8:25 AM
To: Baca, John, NMENV
Subject: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please do not allow this permit for Copper Mining! Look at what happened in Butte, Montana - the Berkeley Pit!
Let's think about the long term effect this will have on our environment in New Mexico and Texas. By long term, I mean decades and decades from now. Please do not allow this to happen.

Respectfully submitted, Deborah Shekter

Baca, John, NMENV

From: Laverne S. Stinnett <dancingswanjewels@gmail.com>
Sent: Tuesday, September 25, 2018 12:25 PM
To: Baca, John, NMENV
Subject: [EXT] "In the matter of Copper Flats Mine discharge permit 1840, docket number 8WB-18-06 [P]"

To all who are involved with this project, I live on Animas Creek, located south of this mine. I live with 300+ year old Arizona Sycamores on this property. They are ancient, beautiful wise sentinels in the creek, their life much longer then ours...and I want them to live in good health on this creek for future generations to enjoy. They are NOT replaceable. These trees are a treasure worth far more then a mine which rips up the landscape and pollutes our water. I feel we have a moral responsibility to this Earth, our home to care for & preserve it. Let morals rule, NOT MONEY. I feel this whole thing is about greed and money. I am VERY VERY opposed to this mine being operational. Our water table here on Animas Creek is already somewhat polluted from the original mine operation. WHO is responsible for cleaning it up?? Empty promises ...why should we all believe it will be 'different' this time?? NO,NO,NO!

Laverne S Kennedy
395 Animas Creek Road
Caballo N.M.
575-649-3424

Baca, John, NMENV

From: Thomas Kindig <tokind@gmail.com>
Sent: Tuesday, September 25, 2018 1:14 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Sir,
The permit for Copper Flat Mine outside Hillsboro would allow New Mexico Copper Corp. to discharge 24 million gallons per day of contaminated wastewater that "may move directly or indirectly into the groundwater" and "may contain water contaminants or toxic pollutants elevated above the standards" of New Mexico's Clean Water Act.

One of New Mexico's most endangered resources is groundwater. As our region continues to experience dry conditions which deplete our surface water resources, it would be criminal to risk our groundwater resources in this fashion. Release of contaminated substances to our environment should be met with massive penalties - not permits.

Thanks,

Thomas
- We are as gods and have to get good at it. -Stewart Brand

Baca, John, NMENV

From: A.T. Cole <atandcinda@gmail.com>
Sent: Tuesday, September 25, 2018 2:50 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Hello:

This request ignores the reality of our times. There is a shortage of potable water and to allow this magnitude of dumping is unconscionable. Please say 'No."

A.T. & Lucinda Cole
Grant County Residents

"We are faced with the most colossal set of events in human history: *the catastrophic convergence* of poverty, violence and climate change." Christian Parenti

Baca, John, NMENV

From: Robert Johnson <rjwata@gmail.com>
Sent: Tuesday, September 25, 2018 11:07 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Dear Mr. Baca,

I'd like to voice my opposition to Copper Flat Mine's discharge permit 1840, for the following reasons:

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.

Sincerely,
Robert Johnson
Albuquerque, NM, USA

Baca, John, NMENV

From: Kathryn Albrecht <lapaz@zianet.com>
Sent: Wednesday, September 26, 2018 1:41 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Please deny the Copper Flat discharge permit, due to inevitable surface and groundwater contamination it would engender. Thank you!

Kathy Albrecht

--
Kathryn Albrecht
San Antonio, NM

"Do not be daunted by the enormity of the world's grief.
Act justly now. Love mercy now. Walk humbly now.
You are not obligated to complete the work,
but neither are you free to abandon it." — The Talmud

Baca, John, NMENV

From: Kathryn Albrecht <lapaz@zianet.com>
Sent: Wednesday, September 26, 2018 1:47 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

The pit size, well-drafting of water for the mining operation, and paucity of water in that watershed & region makes mining unfeasible in its entirety. Thank you,

--
Kathryn Albrecht
San Antonio, NM

"Do not be daunted by the enormity of the world's grief.
Act justly now. Love mercy now. Walk humbly now.
You are not obligated to complete the work,
but neither are you free to abandon it." — The Talmud

Baca, John, NMENV

From: Brittany Fallon <blfallon@gmail.com>
Sent: Wednesday, September 26, 2018 2:26 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am a voting citizen and I would like this permit to be rejected. Thank you.

Baca, John, NMENV

From: pgnm <pgnm@comcast.net>
Sent: Wednesday, September 26, 2018 8:51 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Stop Copper Flat Mine.
Pat Duncan.
Los Lunas NM

Sent from my Verizon, Samsung Galaxy smartphone

Baca, John, NMENV

From: Debora Nicoll <4ncx123@gmail.com>
Sent: Thursday, September 27, 2018 4:14 PM
To: Baca, John, NMENV
Subject: [EXT] DP 1840, Docket 8WB-18-06(P), copper flat mine

Dear Secretary of Environment,

I am Debora Nicoll, (105 Caje Trail Rd, Hillsboro NM 88042) and am writing regarding the discharge permit 1840 for copper flat mine in Hillsboro NM, Docket No. 8WB-18-06(P). I am a retired biomedical researcher with a BS in chemistry and a PhD in biology.

I oppose your granting this permit. The mine owners seem very vague about how they propose to deal with the "pit lake" after mining. In their environmental impact statement, they have referred to the current pit lake as an environmental sink with water inputs coming from groundwater and precipitation and with evaporation exceeding those inputs. This, of course means, that any contaminants in the pit lake are becoming more concentrated with time. The mine company also mentioned that the current pit lake already has displayed elevated levels of a number of metals including aluminum, lead, cadmium and zinc. The mining company states that because of this, the pit mine does not meet standards for uses in warm water aquatic habitat, livestock watering or for wild life habitat.

The mining plan includes pumping water from the pit lake and using it on the walls of the mine to control dust. I understand this to mean that they will pump the contaminated water from the bottom of the pit and spray it on the roads leading down into the mine. That water will pick up additional contaminants while draining back to the bottom of the pit and those contaminants will become more concentrated with time.

The pit lake is in contact with groundwater as evidenced by the input of groundwater to the pit lake. Since this is so, that also means that the contaminants in the pit lake can diffuse into the ground water and flow, most likely into the direction of Lake Caballo and the Rio Grande, or, perhaps more alarmingly, into the wells, seeps and springs that are used by local human and non human residents.

It seems that the best way to deal with the pit lake after mining would be to backfill the pit and bring the area back up to contour. This is exactly what the mine company says it is <u>not</u> doing. Instead, they propose to allow the lake to fill and to plant trees and other landscaping and make it accessible to wildlife. This sounds like a perfect recipe for ridding the area of all the local fauna.

Given all these points, I must highly encourage you not to approve discharge permit 1840, docket no. 8WB-18-06(P) for the copper flat mine.

Thank you
Debora Nicoll

Baca, John, NMENV

From: Peter Van Metre <pcvanmet@gmail.com>
Sent: Thursday, September 27, 2018 4:41 PM
To: Baca, John, NMENV; bjmahler59@gmail.com
Subject: [EXT] Comment on Discharge Permit 1840 for Copper Flat Min
Attachments: Copper Flats comment from Van Metre & Mahler.docx

Dear Mr. Baca,

Please find the attached comment on the subject Discharge Permit request.

Regards,
Peter Van Metre and Barbara Mahler

On the Hearing before the Secretary of Environment in the matter of Discharge Permit 1840 for Copper Flat Mine

Docket No. 8WB-18-06(P)

Attention: Hearing Clerk John Baca

Dear Mr. Baca,

We are writing to express our concern about the proposed reopening of the Copper Flat Mine, in particular regarding the Discharge Permit (public notice #2, 2/2/2018, DP#1840). As residents of Kingston, NM, we live only about 10 miles from the mine and have an apple orchard and ground- and surface-water right, so the health of the local environment and the availability and quality of local water resources are important to us. As professional hydrologists, water resources in general are important to us as well. Although we have limited familarity with local hydrogeology in the Copper Flat Mine area, one of us (Van Metre) has 38 years of experience in water quality and sediment chemistry, a Masters Degree in Hydrology from the Univ. of Arizona, and a PhD in Geology from the Univ. of Rouen, France. The other (Mahler) has 25 years of experience in aqueous geochemistry and hydrogeology, with a Masters and PhD in hydrogeology from the Univ. of Texas.

The discharge permit request states that "New Mexico Copper Corporation, proposes to discharge up to 25,264,000 gallons per day (25 MGD) of mine tailings, process water, impacted stormwater, and domestic wastewater to a lined tailing impoundment. ... Potential contaminants from this type of discharge include sulfate, nitrate, total dissolved solids, and metals." We think there are important questions to be answered regarding this request. These include:

1. 25 MGD translates to filling the existing tailings impoundment, about 1 square kilometer in area, with 120 feet thickness of water and tailings over the course of a year. What portion of the 25 MGD is water that must be evaporated to avoid eventual outflows? Annual evaporation is expected to remove only about 6 feet of water. What becomes of the remaining 114 feet of water and tailings? Or over 5 years, 570 feet of water and tailings? The existing tailings impoundment is about 150 feet above the land surface (per the 1996 USGS quadrangle map); how much does NMCC propose to increase the size of the impoundment to accommodate all this material for how many years of mining? We are unclear on how NMCC is proposing to handle the level of discharge requested in the permit.
2. What is the proposed source of the water in the 25 MGD that will be discharged? If a substantial portion of this water will be pumped from the pit as part of the dewatering operations, how will the resulting change in water level affect the groundwater flow system in the area? What will the quality of that water be? The report produced by SRK Consulting (SRK Project Number 19100003; 2018) cites elevated concentrations of copper, sulfate, chloride, TDS, manganese, cobalt, fluoride, sodium, and potassium in pit lake water as a result of periodic Acid Wall Seep (AWS) events. For example, Figure 1.9 in that report shows a maximum copper concentration in the pit lake of 26 mg/L in 2013; the USEPA Maximum Contaminant Level for copper for drinking water is 1.3 mg/L.

We have additional concerns and questions about contradictory information on the hydrologic setting of the mine in the environmental engineering reports that are the foundation of the mining plans and the

Discharge Permit. Two documents from the public record describe the geology and hydrology of the Copper Flats mine site and, specifically, the pit lake. These documents are inconsistent—which one is incorrect? The letter from Shoemaker and Associates to Ms Katie Emmer, dated June 25, 2015, responding to questions raised about the rapid fill scenario, includes and relies heavily on the figure reproduced below (Figure 1). This data and modeling exercise indicates that the groundwater level in the pit will have stabilized at about 4900 feet (amsl) 100 y after mining and a difference in groundwater level from the pit lake to the eastern local maximum of 200-250 feet, which would drive groundwater flow in the direction of the pit. The authors conclude that more than ***20 feet*** of rain on the pit and surrounding drainage area to reverse that gradient and cause pit water to flow into the regional groundwater system.

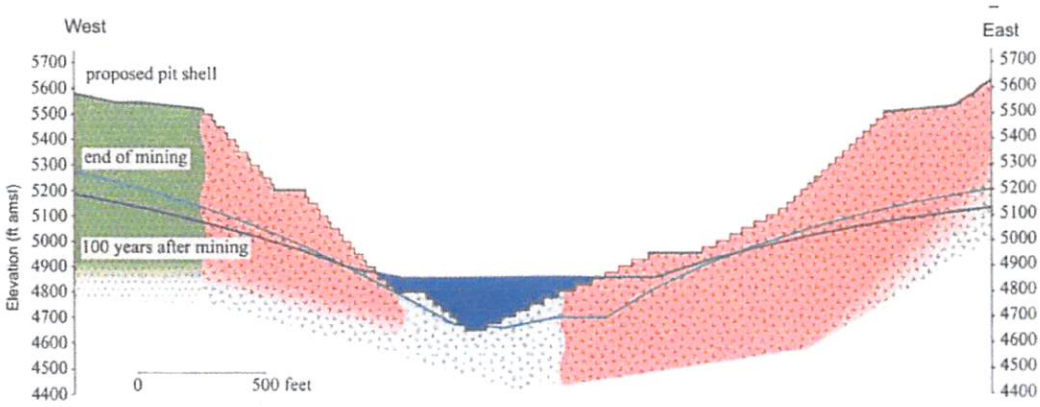
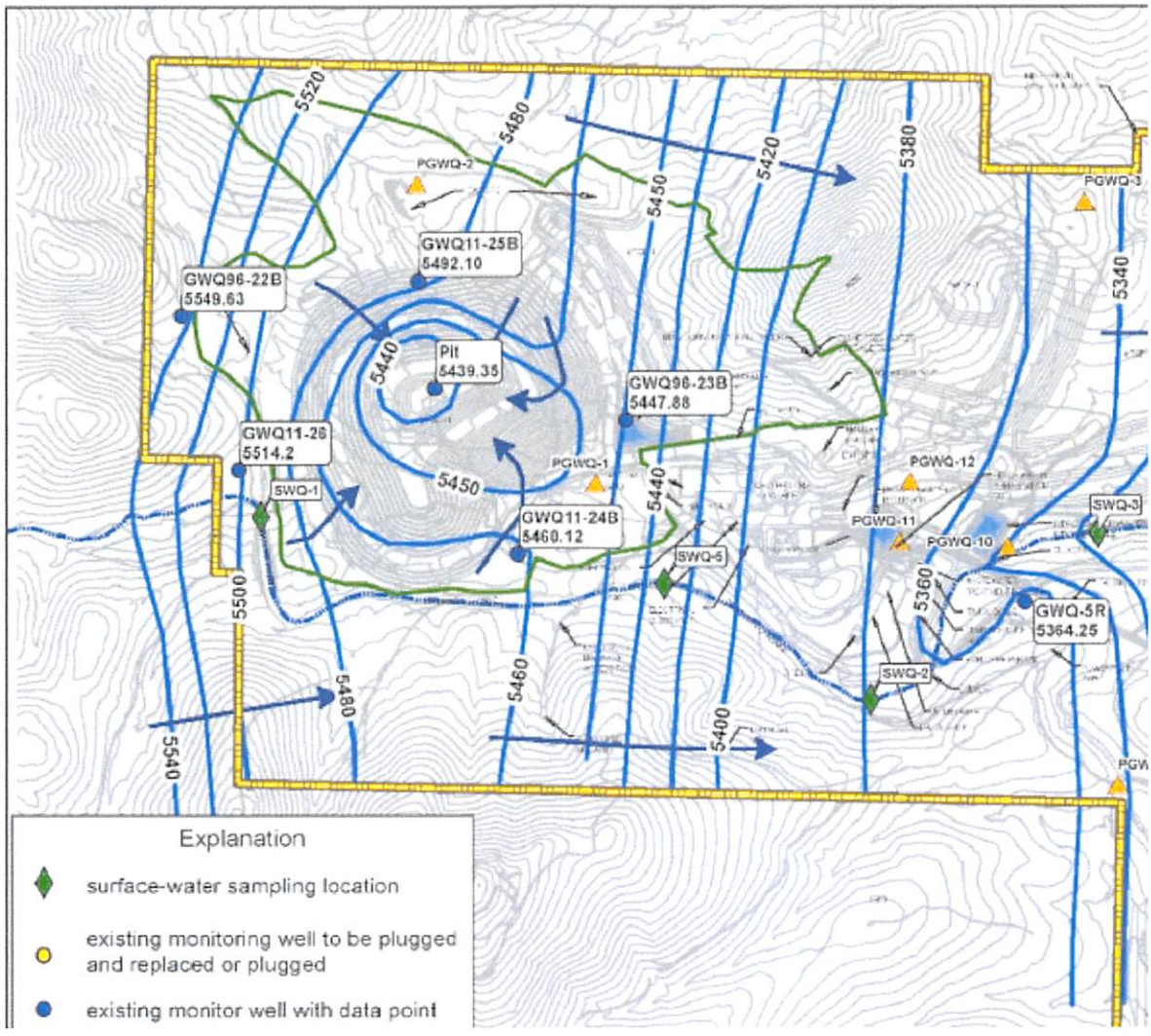


Figure 1. West-to-east profile of post-mining water levels across the open pit.

Figure 1 indicates that the highest water level down-gradient (east) of the pit is always above elevation 5,100 ft amsl. The long-term pit water elevation fluctuates near elevation 4,850 ft amsl, with maximum water elevation of 4,900 ft amsl occurring at the end of rapid fill. To create a flow-through system, water level in the pit would have to exceed elevation 5,100 ft amsl.

However, a figure in NMCC report DP-1840, dated 2018, (Figure 2, reproduced over the mine pit below) shows the current potentiometric surface (groundwater level) at the mine site in map view based on monitoring wells. In this document, the groundwater level at the center of the pit is 5440 feet (amsl), whereas in the Shoemaker and Associates letter the groundwater level in the pit is given as 4900 feet, a different of more than 500 feet. Why would the pit water level stabilize more than 500 feet lower after the next round of mining compared to where it is now? In the NMCC report, the nearest monitoring well to the east, regionally down-gradient, is 5448 feet—just 8 feet above the level in the pit. This indicates that only a small change in water level in the pit relative to the surrounding groundwater level, less than 10 feet, would reverse flow direction, compared to the change of 200-250 feet cited by Shoemaker. The very large inconsistencies between the modeling results presented in the Shoemaker letter and the current groundwater levels raise crucial questions regarding the reliability of the hydrologic assessments that underlie this permit request.

Figure 2 – Ground and Surface Wa



Sincerely,
Dr. Peter Van Metre
Dr. Barbara Mahler
35 Kingston Main Street
Hillsboro, NM 88042

FREEPORT-McMoRan

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

HANS TOWNSEND. PRESIDENT & CHAMBER
DESERT VIEW INN 906 N. DATE

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have.
So why do so many throw their hands up in horror and try to tell us it will be the apocolypse for water, nature and life as these people know it if Copper Flat were to be allowed to proceed?
It really seems that some people think this is the first mine ever to come to Sierra County, when we've had mining here for many, many hundreds of years, and it's still a beautiful place to live.

It's time that our citizens realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community.
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting real opportunities to improve our economy slip away.
Many make the claim that the mine would take away water that we can't afford, but I don't hear the resistance to new pecan orchards that use multiple times more water per acreage, and don't have much economic impact for the citizens.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer in the way of employment, so most of our young people move away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and with no thought for the families that struggle to survive, living a long way below the poverty line. Many of these families have lived in Sierra County for generations.
I hear the claim that this is a retirement community, but that is an assumption that

is based on the present preponderence of older folks, not on the way the community was built.

This city was formed by workers, workers from the dam, workers who brought their families to live and grow here. We still have families, we still build schools for their children.

The reason for the abundance of older people is that we have a generation gap, a gap caused by the migration of young adults leaving to find a place where they can earn a better living. We don't just lose those young adults, we lose their children, and their childrens children, and it leaves a community with the too young to leave, and older adults who don't want or need to leave. Yes, retirees move in, but the percentage would be much smaller if we kept our young adults, and of course their children who would then grow up and restart the cycle.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.

That's partly because Sierra County is so very poor, among the poorest counties in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Paul Tooley
916 Yucca Street
Truth or Consequences, NM 87901
(575) 740-1640

I was born, raised, and a lifelong resident of Sierra County. I served on the Truth or Consequences Municipal School Board for 16 years. I am currently on the Truth or Consequences Fire Department and have served for 32 years and currently hold the position of Fire Chief. I am employed by Sierra County as the Emergency Services Administrator. As a first responder I understand the need for safety regulations, inspections and education. I believe THEMAC Resource Group has done everything possible to meet the requirements of the New Mexico Environment Department Groundwater Quality Bureau. I support the position of the Copper Flat Mine Project and the issuing of their Groundwater Protection Discharge Permit.

Dear State Engineer office

I hope you would support the THEMAC's application to open the copper mine at Copper Flats in Sierra County N.M. I support THEMAC because they have taken every present environmental precaution so far that has been brought up to this point in time. I know a lot about environment construction because I worked 8 years as a survey engineer, and 30 years in maintenance.

Sierra County also needs a break to improve our economy, and to give our local people a chance to have an opportunity and a quality learning experience. If you haven't gone to one of THEMAC's meetings you should go for a quality learning experience.

You will also hear from the Citizens Against Virtually Everything (CAVE) groupe and senior citizens who don't want this mine reopened. They have a lot of reasons not to open this mine because they are afraid to look at the real facts, and the fact that they don't want a new group of young people helping to give our county anew and productive start. I would appreciate that you would sign the necessary documents to open the mine at CopperFlats so that we can have an opportunity to revitalize our people and our economy, and stabilize our county.

Sincerely,

Ted Kuzdrowski
PO Box 1445
Elephant Butte, N.M.87935
1-4-17
Email tedletha105@gmail.com

Baca, John, NMENV

From: Bruce Cosper <brcbruce@outlook.com>
Sent: Friday, September 28, 2018 5:34 AM
To: Baca, John, NMENV
Subject: [EXT] Cooper Flat discharge permit

To Whom it may concern:

My name is Bruce Cosper and I am a resident of Hillsboro N.M. My family has lived here for four generations. My son and business partner Asa Cosper, who also lives here own and operate a construction company, Black Range Const. We are in support of the Cooper Flat Mine. I was living here when Cooper Flat opened and worked out at the mine for Quintana. At the time of the mine operating there was positive influence on the town of Hillsboro and TorC. Young families were able to live here and have decent work that payed well. The school bus that served Hillsboro carried a number of kids instead of the one or two that ride it now. Even when the mine was working at full capacity you would never know it on the streets of Hillsboro. I never heard of anybody's well being effected by the mine, I know for a fact that our well never fell below it's original static level. My uncle, Harvey Chatfield whose family homesteaded there Ranch in Animas creek never had any well problems that resulted from the wells that the mine pumped out of, if they did effect him, and his ranch you would have heard about it from him.
I trust that the EPA and other agency's of the state will do there job, as well as Cooper Flat Mine to keep our environment safe and returned to a more natural state whenever the mine closes. What I am worried about is that some of the people that have been apposing the mines opening. Some have only lived here a short time, and don't know the history of the area some only live here part time. Many of these folk's will sell there homes and move on to somewhere else after a few years of being here weather the mine opens or not. They are retired and really don't care what the economics of the county are in and what this mine can do for young families, for our schools and small business that currently struggle making ends meet. I believe that the positive economics will carry on for years to come and will out way any of the negative that might occur.
I want to Thank you for your consideration and time that you are taking in approving the Cooper Flat mine discharge permit and look forward towards your continuing efforts in making this operation a success.

Thanks Again,
Bruce Cosper
Black Range Const.
Hillsboro N.M.

Sent from Mail for Windows 10

Baca, John, NMENV

From: CEG <ceg@plazarealtynm.com>
Sent: Friday, September 28, 2018 7:35 AM
To: Baca, John, NMENV
Subject: [EXT] copper flat discharge permit

Mr. Baca,

Thank you for the opportunity to comment on the above referenced item. I was not able to address the group in person and am grateful that I may include my position on the record. And, while I am the President of the Sierra County Board of REALTORS, I speak to you in my personal behalf, and not in behalf of the Board of REALTORS.

There will be a great deal of prepared data on both sides that will be presented to you I am sure, however, as I understand the purpose of the public hearing being held in Truth or Consequences, NM is to determine the will of the local public and the impact upon them.

Sierra County is one of the poorest counties in one of the poorest states in the Nation, we can go into many directions as to why, however, to focus on Sierra County, with your approval of the permit, and the subsequent approval of the mining operation, you will afford Sierra County to begin establishing an economic base that will allow for the populace of the county to reap the benefits for generations.

Yes, it is anticipated that the mine will produce for around 12 years, however, there will be time before production begins, and time after production ends where individuals will be employed. It will also allow for additional commerce to consider the area, and may introduce entities to our area that have never considered, or, have previously dismissed our community.

Currently there is only one approved subdivision, with infrastructure, in our county where any building is occurring, and there has only been one home built in that subdivision in the last five years.

I ask that you approve the Copper Flat Discharge Permit, it will be a great blessing to our people, homes and community.

Of course, should you have any questions of me please contact me.

Regards,

C. EARL GREER
PLAZA REALTY
P.O.BOX 985 ELEPHANT BUTTE NM 87935
575.744.5140 FAX 575.744.5121 CELL 505.350.1155
www.plazarealtynm.com
twitter cegreer skype cegreer

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:02 AM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

My husband and I are residents of Sierra County, NM. We retired here three years ago and own both residential and commercial property in Truth or Consequences, NM. We have lived in the Southwest, including AZ, for over forty years, and also own property in Catron County, NM. We love the Southwest and Southern New Mexico in particular.

We pay close attention to economic, water resource, and environmental issues in the U.S. and the Southwest. This week (Sep 24-28), we attended and listened intently to the NMED hearings held in T or C. **We remain opposed to NM Copper Corp. (Themac Resource Group) reopening the Copper Flat Mine in Hillsboro, NM and the issuance of Discharge Permit 1840. This project would have profound long-term detrimental consequences to the water, environment, and people of New Mexico.**

1. First and foremost, 11 years of mining would use 23 billion gallons of water pumped from wells near the Rio Grande River. Unlike agricultural, municipal, or domestic wastewater, this water will not be returned to the soil to be reused. Municipal and agricultural water users in Southern NM, need every drop of water that exists. As you know, ground water is a significant problem throughout the Southwest and particularly in Southern New Mexico. With good reason, New Mexico is currently being sued by Texas regarding excessive agricultural pumping of ground water that feeds the Rio Grande. Independent of the Copper Flat Mine, this has been a huge issue that will be at the Supreme Court within a few short years. This lawsuit itself is clear evidence that NEW MEXICO DOES NOT HAVE GROUND WATER TO SPARE.

2. Approval of this permit creates a significant threat to Southern New Mexico. It would endanger the Caballo Reservoir and the Rio Grande River and all municipal and agricultural water users in the Mesilla Valley. According to this permit application, 113 million tons of discharge would be contained in a 600 acre tailing pond behind a 2 mile sand dam with a 22 acre pit lake of polluted water at the bottom. Even a minor mishap in the dam or the synthetic liner would cause catastrophic damage to surface and ground water, contaminating what little water we have, endangering all human, plant, and animal life. This would mean decades of constant threat to New Mexico groundwater, wildlife, and economic development.

3. The economic benefit of reopening Copper Flat Mine will not be nearly as great as city county, and state officials and business people hope. New Mexico Copper Corp. has only enough water rights to operate three months per year. This means the environmental and economic threat would continue during decades of intermittent mining. The company says it will employ abut 270 employees. But this relatively low number of part-time low wage jobs are of questionable benefit. Based on the NM Copper Corporation's water agreement with the Jicarilla Apache Reservation, their people would have employment preference. Regardless of where employees originate from or settle, the Copper Flat Mine is at least a 30-60 minute one-way drive from most residential communities. Such part-time intermittent employment would be minimally beneficial to Southern New Mexico. In fact, it is likely the mine would not attract permanent residents but, instead, to result in an increased transient population. Most of the economic benefit of this mine would be to Australian-based CEO's and shareholders that are not even NM residents.

To increase NM Tax revenue, it would be of greater long-term benefit to create policies that would attract sustainable energy companies that will offer long-term revenue and resident employment. The cost/benefit ratio of the Copper Flat Mine "opportunity" is way too high. Given very significant threat to the water, environment, and economy and minimal

economic benefit to the people of Souther New Mexico, we urge the NM Environment Department to disapprove Discharge Permit 1840.

We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Jaswant Khalsa <jaswantkhalsa@gmail.com>
Sent: Friday, September 28, 2018 11:09 AM
To: Baca, John, NMENV
Subject: [EXT] Fwd: In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

Correction to Subject

---------- Forwarded message ---------
From: **Jaswant Khalsa** <jaswantkhalsa@gmail.com>
Date: Fri, Sep 28, 2018 at 11:02 AM
Subject: In the Matter of Copper Flat Men's Discharge Permit 1840, Docket No. 8WB-18-06(P)
To: <john.baca2@state.nm.us>

To: New Mexico Environment Department
Butch Tongate, Cabinet Secretary Designate
Kurt Vollbrecht, Director of Mining Environment Compliance

My husband and I are residents of Sierra County, NM. We retired here three years ago and own both residential and commercial property in Truth or Consequences, NM. We have lived in the Southwest, including AZ, for over forty years, and also own property in Catron County, NM. We love the Southwest and Southern New Mexico in particular.

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1. First and foremost, 11 years of mining would use 23 billion gallons of water pumped from wells near the Rio Grande River. Unlike agricultural, municipal, or domestic wastewater, this water will not be returned to the soil to be reused. Municipal and agricultural water users in Southern NM, need every drop of water that exists. As you know, ground water is a significant problem throughout the Southwest and particularly in Southern New Mexico. With good reason, New Mexico is currently being sued by Texas regarding excessive agricultural pumping of ground water that feeds the Rio Grande. Independent of the Copper Flat Mine, this has been a huge issue that will be at the Supreme Court within a few short years. This lawsuit itself is clear evidence that NEW MEXICO DOES NOT HAVE GROUND WATER TO SPARE.

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would have employment preference. Regardless of where employees originate from or settle, the Copper Flat Mine is at least a 30-60 minute one-way drive from most residential communities. Such part-time intermittent employment would be minimally beneficial to Southern New Mexico. In fact, it is likely the mine would not attract permanent residents but, instead, to result in an increased transient population. Most of the economic benefit of this mine would be to Australian-based CEO's and shareholders that are not even NM residents.

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We understand the need for increasing state revenue, but the cost of a project like this is much too high. The NM Environment Department is responsible to the people of this state - not foreign corporations. We urge you to make your decisions accordingly.

Thank you,
Satwant Singh and Jaswant Khalsa
574 W. 4th Ave
T or C, NM 87901
602 359 2146
602 290 8076

Baca, John, NMENV

From: Dan Maxwell <swex@cybermesa.com>
Sent: Friday, September 28, 2018 1:34 PM
To: Baca, John, NMENV; Jeffrey Smith
Subject: [EXT] comments on Copper Flat discharge permit

I have worked in New Mexico as a mining engineer for 43 years, and during my career, I have witnessed the mining industry shrink at an alarming rate. Along with this demise goes the tax base of our rural communities to the point of near extinction for some; just ask the folks in Grant, Hidalgo, Luna, Cibola, McKinley, San Juan, Colfax, Taos and Eddy Counties.

As an alternative to this "old" resource economy, the green community has re-packaged another old idea in its buzz phrase of a "recreation economy". But the jobs in this "Tourism" sector are largely seasonal, low skill and low pay, which leads to further strain on public coffers to support workers during off-season periods of unemployment. With Elephant Butte Lake as an example, long-time Sierra County residents know this all too well; many in the community survive off one assistance program or another during slow periods.

As a major producer, Copper Flat would go a long way towards improving the economy of Sierra County with long-term, skilled, high-paying jobs, and beyond the planned 10-15 year mine life, proposed operations may reveal additional resources for the future. Loud, emotional hyperbole is difficult for the Department to ignore, but from my knowledge of the contents of NMCC's discharge permit application, I support NMED's approval of the Plan on its technical merits.

If you have questions, please email the address above, or call me at 575-537-9594.

Sincerely, Dan Maxwell.

Baca, John, NMENV

From: Bill Bussmann <bussmann@zianet.com>
Sent: Friday, September 28, 2018 4:06 PM
To: Baca, John, NMENV
Subject: [EXT] Copper Flat Mine Discharge Permit 1840 comment

To the Secretary of the Environment for the State of New Mexico

Re: Docket No. 8WB-18-06(P)

In the matter of the Copper Flat mine discharge permit:

Sir:

My name is Bill Bussmann. I live on Animas Creek near the proposed mine and I would like to share my concerns with you.

At this time it makes sense to delay a decision on the discharge permit until such a time as Themac can show they have legitimate water rights for the entire operation. Ongoing litigation over alleged water rights in the lower Rio Grande basin demonstrates the inappropriateness of the NMED issuing a permit for discharge from an operation which has only enough water rights to run 83 days a year, but all the details of the discharge and possible contamination of ground water are calculated using a 12 month a year/11 year life of mine scenario. Sort of like buying the variety dozen pack of Trojans when you don't even know any girls! They should resume the permitting process when they have obtained sufficient legal water rights.

Chief operating officer Jeff Smith mentioned that Tulla was the Mahoney family trust that was going to fully finance the installation and initial operation of the mine, taking all the risk, and taking up the slack when copper prices were down, to ensure a full, non-stop, 11 year operation. Two years ago they agreed that they would discuss the terms on which Chinese mining company Yunnan Haliliya might be able to increase their interest in NMCC to 51%, after an initial 6% investment. The deal fell through, but demonstrates they are really trying to get all the permitting paperwork in order so they can pass off this used car of a mine or, at the very least, sell most of the risk.

Since NMCC has a proven track record of NO reclamations and NO financial assurances in their past mining history, I urge you to proceed with utmost care to ensure that the people of New Mexico are not stuck with the cleanup bill for this toxic rockpile.

Hydrogeologically yours

bill bussmann

hc31 box89

Caballo NM 87931

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Subject: FW: [EXT] Copper Flat permit

John,

For the Copper Flat Hearing record

From: shdooley@aol.com <shdooley@aol.com>
Sent: Thursday, September 27, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: [EXT] Copper Flat permit

The New Mexico Environment Department is holding a public hearing on the discharge permit for the Copper Flat mine in Hillsboro.
The hearing will consider a proposed groundwater discharge permit prepared by the Environment Department in response to a permit application submitted by New Mexico Copper Corporation for discharges from the proposed Copper Flat Mine. The draft permit authorizes the mine operator to discharge 22.3 million gallons per day of tailings, mining impacted and domestic wastewater that could contain contaminants and toxic pollutants above state standards.

The draft discharge permit for the Copper Flat Mine is inadequate. It should be denied, but *at a minimum the permit needs to be re-written with conditions* for the following reasons:

- **Incomplete Characterization** – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. ***The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.***

- **State Water Quality Standards Must Apply** – The draft permit assumes that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. ***The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.***

- **Groundwater Monitoring Is Inadequate** – Even though NMED has added two additional groundwater monitoring wells, the total number of wells and their location are still inadequate. ***The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and/or the tailings storage facility.***

- **Hazard to Public Health and Undue Risk to Property and Public Safety**

- The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.
- The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

- **Streams Important for Wildlife, Including Endangered Species**– Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

- **Financial Assurance**– The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the company default, pushing the costs of cleanup onto taxpayers.

Susanne Hoffman-Dooley
Santa Fe, NM
shdooley@aol.com

Baca, John, NMENV

From: Vollbrecht, Kurt, NMENV
Sent: Friday, September 28, 2018 4:35 PM
To: Baca, John, NMENV
Cc: 'Allyson Siwik' (grip@gilaresources.info); Reid, Brad, NMENV
Subject: FW: [EXT] Copper Flat DP-1840 - GRIP Public Comments
Attachments: GRIP-CopperFlat-DP-1840Hearing.pdf

Hi John,

Please find attached comments from GRIP regarding the draft DP-1840 proceeding.

Thanks Allyson.

Kurt Vollbrecht, Program Manager
Mining Environmental Compliance Section
Ground Water Quality Bureau
New Mexico Environment Department
(505) 827-0195

From: GRIP <grip@gilaresources.info>
Sent: Friday, September 28, 2018 4:21 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Cc: Vollbrecht, Kurt, NMENV <kurt.vollbrecht@state.nm.us>
Subject: [EXT] Copper Flat DP-1840 - GRIP Public Comments

Good afternoon, Brad:

Please find attached public comments from GRIP on the Copper Flat mine DP-1840. I was unable to attend the hearing this week in TorC given a family health emergency.

Thank you for your consideration of our comments.

Allyson Siwik, Executive Director
Gila Resources Information Project
305A North Cooper St.
Silver City, NM 88061
575.538.8078 office/fax
Www.gilaresources.info

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:36 PM
To: Baca, John, NMENV
Subject: FW: Docket No. 8WB-18-06(P)

Another one....

From: Rick Burns <animasrick@gilanet.com>
Sent: Monday, September 24, 2018 11:08 AM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Docket No. 8WB-18-06(P)

Hearing Clerk, John Baca

Docket No. 8WB-18-06(P)

My name is Rick Burns, I live in Animas Creek canyon north of the copper flat well field, and would like this to be included into the public comments re: this discharge permit.

Here are a list of things i find lacking in the current wording of the permit application:

1. Incomplete Characterization – There is inadequate characterization of the bedrock, leaving the potential for contamination to move through the ground. Pollutants from the mine could leak into groundwater contaminating the area's water supply, and could also reach the Rio Grande. The permit must require that the bedrock be fully characterized to determine the possibility of contaminants leaching into groundwater.

2. State Water Quality Standards Must Apply – NMCC is claiming that the pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will combine with clean groundwater – there will be flow-through during at least part of its operation – and the lake is likely to extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

3. Groundwater Monitoring Is Inadequate – Even though NMED has added 2 additional groundwater monitoring wells, the total number of wells and their location is still inadequate. The permit must require sufficient monitoring wells to reliably detect contamination leaking from the mine's waste rock piles and the tailings storage facility.

4. Hazard to Public Health and Undue Risk to Property and Public Safety

o The discharge permit authorizes the discharge of up to 25.3 million gallons per day of tailings, mining-impacted wastewater, and domestic wastewater.

o The mine will dump upwards of 100 billion gallons of polluted liquid waste during its planned operation into a 560-acre pond just 11 miles west of Caballo Reservoir. A collapse or breach at the tailings pond could devastate landowners to the east, Caballo Reservoir, and the Rio Grande.

5. Streams Important for Wildlife, Including Endangered Species – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species.

6. Financial Assurance – The proposed financial assurance in the mine permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation. This was not satisfactorily done during the permitting for Quintana.

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:38 PM
To: Baca, John, NMENV
Subject: FW: Public Commentary Flat Copper Mine

From: Gordon Bryson <gordonbryson@yahoo.com>
Sent: Tuesday, September 18, 2018 3:45 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Public Commentary Flat Copper Mine

Dear Mr. Reid,

I am not a citizen of the state of New Mexico but have lived all my life in East Texas. My opportunities to visit New Mexico have been limited but the several times I've been in the northeastern part of your state have been most enjoyable and always create a desire to return again soon.

My reason for writing this is to register my concern for the proposed Flat Copper Mine and its probable impact on the beautiful streams and natural habitat of a vast part of New Mexico. Not only that immediate area, but a wide watershed area that ultimately impacts the State of Texas via the Rio Grande River. The Animas River incident that happened in the past few years should make all aware of the potential ecological dangers posed by commercial enterprises, especially when foreign corporations who have little concern for our country are permitted to operate here.

As an avid fly fisherman, and father and grandfather to two more generations of active fly fishers. I am deeply concerned about the effects of this project on the fine trout fishing found in the pristine streams of New Mexico.
While not a hunter, I have many friends in Texas who hunt there and the impact on the wildlife is another major issue. People from all parts of Texas visit your state for fishing, camping, hunting, hiking, shopping and other pastimes that generate substantial financial gains for your business people and the state of New Mexico.

Please do not permit this project to proceed in its present format, and only consider acceptance of redefined plans if they are acceptable to all affected environmental entities.

Gordon Bryson
2205 Thornwood
Tyler, TX 75703
903.520.2766
gordonbryson@yahoo.com

Lone Star Fly Fishers on Facebook
Lone Star Fly Fishers (LSFF Website)

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:41 PM
To: Baca, John, NMENV
Subject: FW: New Mexico Copper Flat Mining -horrid idea

From: Fiona Van Reisen <fiona@fionavanreisen.com>
Sent: Sunday, September 16, 2018 3:34 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: New Mexico Copper Flat Mining -horrid idea

Mr Reid,

Please do not go to your grave knowingly allowing this wrong to the environment. It's a lose lose and there's no coming back.

Got a conscience? It will hurt many people as well as ruining the landscape.

Please consider yourself as able to stop a wrong.

Fiona van Reisen

Baca, John, NMENV

From: Reid, Brad, NMENV
Sent: Friday, September 28, 2018 4:42 PM
To: Baca, John, NMENV
Subject: FW: Copper Flat Mine
Attachments: copper flat mine.docx

From: Deborah Brandt <debjbrandt@me.com>
Sent: Thursday, September 13, 2018 2:10 PM
To: Reid, Brad, NMENV <brad.reid@state.nm.us>
Subject: Copper Flat Mine

September 13, 2018

Deborah Brandt

502 W. Hadley Ave

Las Cruces, NM 88005

Dear Brad Reid,

I have property in Kingston, NM and regularly stay there.

The draft proposal for the Copper Flat Mine should be denied for a number of reasons. There is inadequate characterization of the bedrock. Mine pollutants would probably not be adequately contained to prevent groundwater pollution.

Water quality standards are not relevantly addressed, and the proposed groundwater monitoring wells are inadequate.

The discharge permit, authorizing up to 25.3 million gallons per day of potentially polluted wastewater is wholly unacceptable. The impact on streams, humans, wildlife and endangered species could be seriously affected by contamination; even the potential risk is unacceptable.

The amount of water needed for the mines use is staggering to even consider in our arid climate. Pumping our precious water resources would adversely drain and damage our ecosystem, local streams, and the Rio Grande. Not acceptable.

NMCC is not a trustworthy steward. They have been cited for numerous violations.

There is no guarantee that the mine would meet the Water Quality Act, and in this time of loosening environmental regulations, I do not trust that any serious enforcement would occur if NMCC failed to comply.

I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

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I do not want transport trucks on highway 152. The highway was not built for that kind of traffic.

All things considered as a resident and taxpayer in Sierra County I strongly oppose a permit for Copper Flat Mine.

Thank you,

Deborah Brandt

Baca, John, NMENV

From: Cathy Knight <knight.cathy30@gmail.com>
Sent: Friday, September 28, 2018 4:59 PM
To: Baca, John, NMENV
Subject: [EXT] In the Matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

I am against the Copper Flat Mine's request because

1. The discharge (113 million tons) will be contained in a 600-acre (1 square mile) tailing pond behind a 2-mile sand dam. Even a minor break in the retaining dam or its synthetic liner system can cause catastrophic damage to surface water and groundwater to the east and south of the mine, endangering the Caballo Reservoir and the Rio Grande and therefore all municipal and agricultural water users in the Mesilla Valley. This threat to people and the economy will exist until two decades past closure, when the 24 billion gallons of wastewater (that once was drinking water) is finally evaporated and the tailing pond buried. Unlike agricultural, municipal, or domestic wastewater, this water will not return to the soil to be reused.

2. The pit will be 2,800 feet across and 900 feet deep at cessation of mining and have a 22-acre pitlake at its bottom with water that many state agencies think will be polluted. That pitlake will be left in perpetuity, constituting a deadly hazard to birds, bats, and animals forever. Being hundreds of feet below groundwater level, it will perpetually be a drain on water supply even if it does not contaminate groundwater.

3. New Mexico Copper has only enough water rights to operate three months every year. While the company projects an 11-year operation, in reality it will mine intermittently for decades. During that extended period, Copper Flat Mine remains unreclaimed, the polluted pitlake and the tailings pond will be a constant threat to New Mexico wildlife if not to New Mexico groundwater.

4. Eleven years of mining will require 23 billion gallons of water pumped from wells near the Rio Grande River. The pumping will damage the river's flow, raise New Mexico's liabilities in Texas's lawsuit challenging our state's management of the river, and may cost New Mexico taxpayers millions of dollars.
Please attend the hearing this week in Truth or Consequences or write to the Environment Department to show that New Mexicans oppose this dangerous and wasteful use of our water.

New Mexico does not need anymore bad environmental decisions. I am seeing plenty of them throughout our state. We should be conserving our waters not wasting and poluting them. I grew up in Silver City and had many drives through the beautiful Black Range in route to T or C for weekends at Elephant Butte. Please choose to protect our lands.

Cathy Knight
202 S. Lea Ave.
Roswell, NM 88203

Baca, John, NMENV

From: Robbin Brodsky <robbinbrodsky@gmail.com>
Sent: Tuesday, September 18, 2018 3:06 PM
To: Baca, John, NMENV
Subject: Comments on the hearing before the Secretary of Environment

Concerning discharge permit #1840 for Copper Flat Mine, Docket #8WB-18-06 (P)
I oppose granting this permit. My name is Joyce Robbin Brodsky. I am a resident of Hillsboro, New Mexico and a member of the National Audubon Society, New Mexico Wild, and the National Wildlife Federation. Themac's plans to mine copper and other ores using a pit mine and construct a tailings containment pond that will cover approximately 1 square mile will appear to our migrating bird populations as a welcoming stopover. When in fact, the waters would most likely kill these birds with the pollutants as in what happened at a copper mine outside of Butte, Montana when a flock of migrating geese landed in pit waters and died. Necropsies showed their insides were lined with burns and festering sores from exposure to high concentrations of copper, cadmium, and arsenic. Then there is the 4-legged wildlife such as deer, elk, bear, mountain lion, javelina that will see the water in this high desert environment very inviting. It does not make sense that an individual in Australia will profit from the loss of our wildlife. Please keep our state's vulnerable wildlife in mind when considering your decision.

GILA RESOURCES INFORMATION PROJECT

20 Years of Promoting Healthy Communities by Protecting Our Environment

September 28, 2018

Brad Reid, Permit Lead
New Mexico Environment Department
Ground Water Quality Bureau
1190 South St. Francis Dr.
PO Box 5469
Santa Fe, NM. 87502

Via e-mail: brad.reid@state.nm.us

RE: Public Comment on Copper Flat Mine Discharge Permit (DP-1840)

Dear Mr. Reid:

I am submitting the following public comments on behalf of the Gila Resources Information Project (GRIP) regarding the Copper Flat Mine Discharge Permit (DP-1840). GRIP was unable to attend the public hearing in Truth or Consequences and provide oral comments. I am therefore submitting them in writing.

GRIP is very concerned that the draft discharge permit DP-1840 will not adequately protect surface and groundwater quality in the vicinity of the Copper Flat Mine. We believe the draft permit should be denied or re-written with appropriate conditions to protect water resources.

- **Require full characterization of bedrock underneath the mine site** – The mine operator has not conducted an adequate characterization of the bedrock underneath the mine. It is unknown the magnitude of the potential for pollutants to move through the ground, contaminating groundwater that serves as the area's water supply. Based on the extensive experience at Grant County copper mines with mine-impacted groundwater moving into the regional aquifer or offsite, the draft DP-1840 should require extensive evaluation of the geology underneath the mine to understand the potential for transport of mine effluent and to in turn develop appropriate permit conditions to protect groundwater.

- **Mandate that state water quality standards apply** – The draft permit assumes that the mine pit lake is not part of the Waters of the State of New Mexico and therefore not subject to surface water quality standards. However, the pit lake will likely combine with clean groundwater and extend onto public land. The permit must acknowledge that these are Waters of the State and that all relevant water quality standards must apply.

- **Expand groundwater monitoring network at mine site** – We concur with NMED's requirement for two additional groundwater monitoring wells, but we believe this is still insufficient to reliably detect contamination discharged from the mine's waste rock piles and the tailings storage facility. As seen at the Tyrone mine, mine-impacted groundwater has moved across a fault line that was thought to be a barrier to groundwater movement. Contamination has also moved into the regional aquifer. Because the monitoring network is not dense enough, this contamination was able to move downgradient without being detected until much later. An effective monitoring network is critical to the capture system that will contain discharges from the Copper Flat mine site. GRIP believes that the monitoring network must be expanded to properly detect discharges from the mine site.

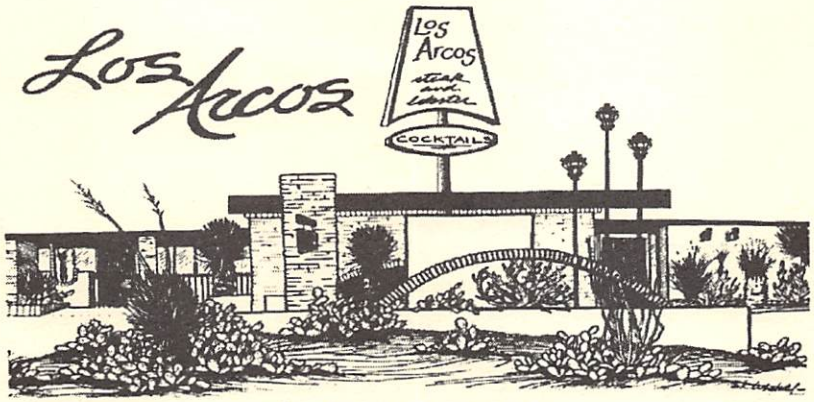
- **Ensure that streams important for wildlife and endangered species are protected** – Two arroyos run through the mine site and others in the area could also be impacted by surface and groundwater contamination. The permit must ensure that the mine does not damage vital habitat and forage for wildlife, including several threatened and endangered species. We are particularly concerned that stormwater management plans at the Copper Flat mine take into consideration climate change predictions of increased frequency of severe precipitation events. Best management practice recommends that design standards use a 200-year/24-hour storm event. More severe 500-year storm events have already occurred in the region. Permit conditions should reflect the reality on the ground.

- **Require adequate financial assurance to protect the state, taxpayers and local communities** – The proposed financial assurance in the draft permit is insufficient to cover the costs of long-term monitoring and maintenance of post-mining site reclamation should the mine operator default. Cost estimates should be developed assuming monitoring and maintenance for at least 100 years, and sufficient financial assurance put in place to cover these costs.

Thank you for your consideration of our comments.

Sincerely,

Allyson Siwik
Executive Director



P. O. Box 786 • 1400 North Date St.
(505) 894-6200
Truth or Consequences, New Mexico 87901

9/27/2018

Felicia Orth,

My name is Robert Middleton. I was born here in Hot Springs (now Truth or Consequences), New Mexico. I own Los Arcos Steak and Lobster Restaurant in T or C. and have been in business here for over 48 years. I did not have a chance to speak at the NMCC Copper Flat Mine Groundwater Protection Discharge permit. Thanks for allowing me to submit a written statement.

I have strong feelings about the positive economic impact that it will have on our struggling community and have seen the positive economic impact personally here in Sierra County. I was in business at Los Arcos in the late 70's and early 80's while the Quintana Mine was in the construction and production phase. It was the only time in the last 48 years that I have seen a significant economic impact in my business and in our community. Our community was flourishing due to workers with good paying jobs and paychecks to spend here in our community. It would be wonderful to see that again and for our youth to have the opportunity of choice to remain in our community without leaving for employment elsewhere as we have seen for years.

Thank you for your consideration.

Sincerely,

Robert Middleton (owner)
Los Arcos Steak and Lobster

State of New Mexico

Shelly Trujillo
County Clerk
575-894-2840

Terri Copsin
County Treasurer
575-894-3524

Keith W. Whitney
County Assessor
575-894-2589

Tom Pestak
Probate Judge
575-894-2840

SIERRA COUNTY
NEW MEXICO

855 Van Patten Street
Truth or Consequences, New Mexico 87901

Bruce Swingle, County Manager
575-894-6215 voice 575-894-9548 fax

County of Sierra

Kenneth Lyon
Chair
575-894-6215

Frances Luna
Commission Vice-Chair
575-894-6215

Jim Paxon
Commissioner
575-894-6215

Glenn Hamilton
County Sheriff
575-894-9150

NM Environment Department
Copper Flat Mine Ground Water Discharge Permit Public Hearing
September 24-28, 2018

My name is Bruce Swingle, County Manager for Sierra County and I am speaking on behalf of the Sierra County Board of County Commissioners. The Sierra County Commission has and continues to support Copper Flat Mine. In determining whether to support the Mine, as a matter of public policy, County leadership relied on much data and information presented by many credentialed professionals. Professionals with extensive experience and expertise.

After assessing New Mexico Copper Corporation's (NMCC) business model and environmental safeguards, the county commission has approved two resolutions of support for the Mine. The City of Elephant Butte and Village of Williamsburg also approved resolutions of support. Suffice it to say, the vast majority of Sierra County residents support the Mine.

Today, NMCC gave an impressive presentation on Copper Flat Mine operations and mitigation plans to protect the environment and area resources.
Let us not forget, NMCC is trying to reopen a mine that has been operating on and off for generations, in an area where the mining of copper and other precious metals has been a part of this community since the 1880's. Mining, particularly at the Copper Flat Mine site is culturally and historically connected to Sierra County. Hillsboro was originally selected as Sierra County's, county seat, only because of mining and the mining population in the area.

Many misrepresentations are circulating about how the Mine will harm the Rio Grande Valley. These misrepresentations are intended to scare people and create hysteria against the Mine. The fact is NMCC is committed to responsible mining and implementing reasonable environmental protections to safeguard our community and state.

One of the misrepresentations is that due to a water contract, the Mine is required to hire only members of the Jicarilla Apache Nation. "Indian Preference" language is common boilerplate language in contracts with Native American entities. As a former County Manager in McKinley County, I entered in to a number of contracts with similar language. "Indian Preference" simply means that if you have two candidates with equal skills, experience and suitability, you hire the Native American. You hire the candidate that is best qualified and best suited for the job, which of course could be a Jicarilla Apache member.

Regardless of the contract with the Jicarilla's, the Mine will need to hire many skilled workers from outside the county. Sierra County does not have enough skilled workers in the mining industry to satisfy the Mine's needs. Growing our community's population is an intended benefit we welcome.

Another misrepresentation is that NMCC will bus employees to the Mine from various areas of the state. Thus, no or limited Sierra County residents will be employed. The truth of the matter, creating vanpools to transport workers to the job site is positive for all concerned. Transporting workers from T or C to the Mine decreases traffic and serves as a benefit to employees. The St. Cloud Mine and many other operations around the state use vanpools.

The final misrepresentation I will discuss is about mining camps. This misinformation claims that no Mine employees will live or shop in our community, and that Mine employees will be forced to live, work and shop on Mine property. NMCC is not creating mining camps in Sierra County; although, mining camps, research camps, oil and gas field camps, and the like, serve a purpose in extremely remote areas. Copper Flat Mine is not in an extremely remote area.

Sierra County and the State of New Mexico need Cooper Flat Mine. New Mexico and Sierra County rank at the bottom of most socioeconomic measures. Copper Flat Mine can single-handedly change the economic landscape in Sierra County and vastly improve New Mexico's economy, without compromising the environment.

Sierra County's "Per Capita Income" is a meager $20,495, while the National rate is over twice that of Sierra County at $58,030. Sierra County is truly one of the poorest counties, in one of the poorest states.

The county's "Median Household Income" is $29,679, substantially lower than New Mexico's rate of $46,748. The National "Median Household Income" rate is even higher at $59,039.

New Mexico has the 2nd worst "Poverty" rate in the United States at 20.4%. The National "Poverty" rate is 12.7%, while Sierra County's "Poverty" rate is over 22%. 22.1%

The "Mean Property Value" in Sierra County is $89,900, compared to New Mexico's at $167,500. Properties are not selling and there is virtually no new construction in Sierra County.

As of March 2018, Sierra County's "Unemployment" rate was 8.8%, compared to New Mexico's rate of 5.6%.

To compound the issue, Sierra County is losing its population. The county's population has declined about 19%, since 2000. Unfortunately, without the Mine and similar economic development projects that create jobs, the county's population will continue to decline.

Currently, our youth leave the community to seek meaningful employment, while our skilled workers work for far less than they can make in nearby communities. One cannot blame our youth and skilled workforce for leaving; they must work and receive reasonable wages.

From a public policy perspective, the only thing worse than the out migration of residents, is for

residents capable of working to stay in Sierra County. If they stay, they will remain unemployed or under-employed and survive on some form of government welfare or social assistance program.

Sierra County needs this Mine. Copper Flat Mine will provide a significant economic boost to Sierra County and New Mexico through job creation and tax revenues. The Mine will create approximately 1,300 direct, indirect and induced jobs. Copper Flat Mine is expected to create 275 direct jobs, making it the largest employer in the county. The estimated **taxes** paid over construction and life of the Mine is approximately $175 million.

Property taxes alone are projected to exceed 6.5 million dollars. In a county that only collects 8 million dollars a year in property taxes, the Mine's taxes will equate to improved services, better quality of life for our residents and provided much needed revenue to our schools.

The Mine will stimulate population growth, improve employment rates, increase earnings per capita, positively affect our housing market, improve the quality of life of area residents, and certainly affect other key-industries in the area, such as, construction, retail, arts, entertainment, recreation, health care, and tourism.

The entire state will benefit from Copper Flat Mine. As of February 2018, NMCC has spent 38.8 million dollars in New Mexico. Of that, $3.4 million in Sierra County, $12.6 million in Albuquerque and $22.8 million in other areas of the state.

With respect to the environment, we are all environmentalists. We all want to protect our natural resources; these resources sustain our way of life and our culture. However, if someone is against mining because of a belief that all mineral extraction is an assault on the environment, they will never support Copper Flat Mine or any other mine for that matter.

Reasonableness must prevail. Mining is accomplished all over the country without harming the environment. After hearing NMCC's presentation, reasonable people will agree that NMCC is implementing reasonable safeguards to protect the environment and our community.

This environmental debate reminds me of the **Dakota Pipeline protests** in 2016. Extremists, and I do not use the term "extremist" carelessly or irresponsibly... Extremists from around the country reacted to construction of an oil pipeline running from North Dakota to southern Illinois. In reality, it was a pipeline similar to the 2.4 million miles of energy-pipeline running across this country. This specific pipeline created no greater threat than any other pipeline to the environment, but these individuals, failed to reason and believed this particular pipeline would cause irreparable harm to the environment.

Folks, you are seeing an extreme element that will not reason or rationalize facts. They are against the Mine no matter what measures NMCC employs. They believe mining, in any fashion, will destroy the environment. They believe creating good paying jobs through mineral extraction is harmful to the environment. They fail to comprehend that preservation of the environment and the creation of jobs are not mutually exclusive.

After decades of regulations, state and federal oversight, and scientific and technological advancements, extremist refuse to acknowledge that a win win scenario can be achieved. Based on the plan articulated by NMCC today, the Sierra County Commission believes NMCC's Mine exceeds every reasonable standard.

The commission implores you to make a reasonable decision, make the right decision for Sierra County and the State of New Mexico, and approve Copper Flat Mine's Groundwater Protection Discharge Permit.

Thank you for giving Sierra County the time and opportunity to support Copper Flat Mine.

Total annual payroll, 2016 ($1,000)

QuickFacts
Sierra County, New Mexico

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

PEOPLE	
Population	
Population estimates, July 1, 2017, (V2017)	11,116
Population estimates base, April 1, 2010, (V2017)	11,994
Population, percent change - April 1, 2010 (estimates base) to July 1, 2017, (V2017)	-7.3%
Population, Census, April 1, 2010	11,988
Age and Sex	
Persons under 5 years, percent	▲ 4.9%
Persons under 18 years, percent	▲ 15.8%
Persons 65 years and over, percent	▲ 35.5%
Female persons, percent	▲ 49.7%
Race and Hispanic Origin	
White alone, percent (a)	▲ 92.3%
Black or African American alone, percent (a)	▲ 0.8%
American Indian and Alaska Native alone, percent (a)	▲ 3.0%
Asian alone, percent (a)	▲ 0.7%
Native Hawaiian and Other Pacific Islander alone, percent (a)	▲ 0.1%
Two or More Races, percent	▲ 3.1%
Hispanic or Latino, percent (b)	▲ 30.3%
White alone, not Hispanic or Latino, percent	▲ 65.1%
Population Characteristics	
Veterans, 2012-2016	1,837
Foreign born persons, percent, 2012-2016	4.0%
Housing	
Housing units, July 1, 2017, (V2017)	8,542
Owner-occupied housing unit rate, 2012-2016	72.6%
Median value of owner-occupied housing units, 2012-2016	$89,900
Median selected monthly owner costs -with a mortgage, 2012-2016	$838
Median selected monthly owner costs -without a mortgage, 2012-2016	$273
Median gross rent, 2012-2016	$582
Building permits, 2017	1
Families & Living Arrangements	
Households, 2012-2016	5,341
Persons per household, 2012-2016	2.10
Living in same house 1 year ago, percent of persons age 1 year+, 2012-2016	88.6%
Language other than English spoken at home, percent of persons age 5 years+, 2012-2016	19.5%
Education	
High school graduate or higher, percent of persons age 25 years+, 2012-2016	82.8%
Bachelor's degree or higher, percent of persons age 25 years+, 2012-2016	17.7%
Health	
With a disability, under age 65 years, percent, 2012-2016	14.9%
Persons without health insurance, under age 65 years, percent	▲ 10.3%
Economy	
In civilian labor force, total, percent of population age 16 years+, 2012-2016	44.7%
In civilian labor force, female, percent of population age 16 years+, 2012-2016	43.7%
Total accommodation and food services sales, 2012 ($1,000) (c)	15,787
Total health care and social assistance receipts/revenue, 2012 ($1,000) (c)	40,197
Total manufacturers shipments, 2012 ($1,000) (c)	D
Total merchant wholesaler sales, 2012 ($1,000) (c)	D

Total retail sales, 2012 ($1,000) (c)	102,090
Total retail sales per capita, 2012 (c)	$8,583
Transportation	
Mean travel time to work (minutes), workers age 16 years+, 2012-2016	16.1
Income & Poverty	
Median household income (in 2016 dollars), 2012-2016	$29,679
Per capita income in past 12 months (in 2016 dollars), 2012-2016	$20,495
Persons in poverty, percent	⚠ 27.0%

BUSINESSES

Businesses	
Total employer establishments, 2016	217
Total employment, 2016	2,411
Total annual payroll, 2016 ($1,000)	**64,049**
Total employment, percent change, 2015-2016	4.0%
Total nonemployer establishments, 2016	713
All firms, 2012	837
Men-owned firms, 2012	333
Women-owned firms, 2012	299
Minority-owned firms, 2012	209
Nonminority-owned firms, 2012	558
Veteran-owned firms, 2012	104
Nonveteran-owned firms, 2012	652

GEOGRAPHY

Geography	
Population per square mile, 2010	2.9
Land area in square miles, 2010	4,178.96
FIPS Code	35051

Value Notes

⚠ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to the left of e TABLE view to learn about sampling error.

The vintage year (e.g., V2017) refers to the final year of the series (2010 thru 2017). *Different vintage years of estimates are not comparable.*

Fact Notes

(a) Includes persons reporting only one race
(b) Hispanics may be of any race, so also are included in applicable race categories
(c) Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

Value Flags

D Suppressed to avoid disclosure of confidential information
F Fewer than 25 firms
FN Footnote on this item in place of data
NA Not available
S Suppressed; does not meet publication standards
X Not applicable
Z Value greater than zero but less than half unit of measure shown
- Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of distribution.

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

WAGES

Median Household Income

View Data Save Image Share/Embed Add Data to Cart

$29,679

2016 VALUE
± $3,208

Households in Sierra County, NM have a median annual income of $29,679, which is less than the median annual income in the United States. Look at the chart to see how the median household income in Sierra County, NM compares to that in it's parent locations.

Dataset:
Source:

Google sierra county nm unemployment rate

All News Images Shopping Maps More Settings Tools

About 506,000 results (0.81 seconds)

Sierra County, New Mexico / Unemployment rate

8.8% (Mar 2018)

Explore more

Sources include: Bureau of Labor Statistics *Feedback*

Unemployment Rate in Sierra County, NM - FRED - Federal Reserve ...
https://fred.stlouisfed.org/series/NMSIER1URN?utm_source=series...
Aug 1, 2018 - Graph and download economic data from Jan 1990 to Jun 2018 about Sierra County, NM; NM; Prosperity Scorecard; unemployment; rate; and ...

Unemployment Rate in Sierra County, NM - FRED - Federal Reserve ...
https://fred.stlouisfed.org/series/LAUCN350510000000003A
Graph and download economic data from 1990 to 2017 about Sierra County, NM; NM; Prosperity Scorecard; unemployment; rate; and USA.

NM; Sierra County, NM; Rate; BLS; County - Economic Data Series ...
https://fred.stlouisfed.org/.../series?...bls%3Bcounty%3Bnm%3Brate%3Bsierra+county...
2 economic data series with tags: NM; Sierra County, NM; Rate; BLS; County. FRED: Download ... Unemployment Rate in Sierra County, NM. Percent, Not ...

Employment & Unemployment - Map: LA - Bureau of Labor Statistics
https://data.bls.gov/map/MapToolServlet?...unemployment...county...u
Map Title: Unemployment rates by county, not seasonally adjusted. Map Type: New Mexico county Map Month/Year: ... Sierra County, 9.1. Socorro County, 6.5.

[PDF] Population Ratio Estimates The Employment-to-Population Rat
https://www.dws.state.nm.us/.../The_Employment-to-Population_Ratio_Official_and_...
of county-level E/P ratios from the Census Bureau's American .... Exhibit 3: New Mexico and United States Share of Population Fully Utilized .... Sierra County.
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FRED | Unemployment Rate in Sierra County, NM | Quandl
https://www.quandl.com/.../NMSIER1URN-Unemployment-Rate-in-Sierra-County-N...
Quandl is a marketplace for financial, economic and alternative data delivered in modern formats for today's analysts, including Python, Excel, Matlab, R, and via ...

Sierra County NM Economy data business market research Dona Ana ...
www.towncharts.com › USA › New Mexico
Sierra County NM Economy data business market research with charts and graphs ... earnings, self employment, poverty, commuting Dona Ana County and Socorro County. ... Figure 16 shows Sierra County illustrates it has 4.5% unemployment rate which is the .... Figure 1: Sierra County, NM Median Earnings per Worker

U.S. Census Bureau QuickFacts: Sierra County, New Mexico
https://www.census.gov/quickfacts/table/BZA210214/35051

Sierra County, New Mexic

Sierra County is a county in the U.S. state of Ne census, the population was 11,988. Its county s Consequences. Wikipedia

Area: 4,236 mi²
Population: 11,282 (2015)
County seat: Truth or Consequences
Points of interest: Elephant Butte Lake State Pa
Rivers: Alamosa Creek, Taylor Creek, Rio Grand

Destinations


Gila National Forest


Truth or Conseque...


Cibola National Forest

E B

People also search for


New Mexico


Grant County, New Mexi...

Community Facts - Find popular facts (population, income, etc.) and frequently requested data about your community.

Enter a state, county, city, town, or zip code:

e.g., Atlanta, GA

GO

Population
Age
Business and Industry
Education
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Housing
Income
Origins and Language
Poverty
Race and Hispanic Origin
Veterans
Show All

Sierra County, New Mexico

Population

Bookmark/Save Print

2017 Population Estimate (as of July 1, 2017)

11,116 Source: **2017 Population Estimates (/bkmk/table/1.0/en/PEP/2017/PEPANNRES/0500000US35051)**

Popular tables for this geography:

2010 Census

General Population and Housing Characteristics (Population, Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/DEC/10_DP/DPDP1/0500000US35051)
Race and Hispanic or Latino Origin (/bkmk/table/1.0/en/DEC/10_SF1/QTP3/0500000US35051)
Hispanic or Latino by Type (Mexican, Puerto Rican, ...) (/bkmk/table/1.0/en/DEC/10_SF1/QTP10/0500000US35051)
Households and Families (Relationships, Children, Household Size, ...) (/bkmk/table/1.0/en/DEC/10_SF1/QTP11/0500000US35051)
Compare Cities and Towns for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/10_SF1/GCTPH1.CY10/0500000US35051)
Compare Census Tracts for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/10_SF1/GCTPH1.CY07/0500000US35051)

2016 American Community Survey

Demographic and Housing Estimates (Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/ACS/16_5YR/DP05/0500000US35051)

2017 Population Estimates Program

Annual Population Estimates (/bkmk/table/1.0/en/PEP/2017/PEPANNRES/0500000US35051)

Census 2000

General Demographic Characteristics (Population, Age, Sex, Race, Households and Housing, ...) (/bkmk/table/1.0/en/DEC/00_SF1/DP1/0500000US35051)
Compare Cities and Towns for Population, Housing, Area, and Density (/bkmk/table/1.0/en/DEC/00_SF1/GCTPH1.CY10/0500000US35051)

Want more? Need help? Use Guided Search or visit Census.gov's Quick Facts (//www.census.gov/quickfacts/).

Reopening the Copper Flat mine is a terrible idea on several counts.

I spoke with Brad Reid at the water quality bureau in Albuquerque, who told me that this mine will require a water tailing storage facility encompassing several hundred acres. It will be an open air, plastic lined pit of several hundred acres! Any runoff will flow down the face of a dam into some sort of collection pond. I don't know the size of that. What kind of vapors will that give off? Toxic elements that will drift into the air around the neighbors in the area? The absolute destruction of several hundred acres of beautiful land and wildlife habitat should be enough to block this project, but to dump noxious tailings into such a huge, plastic lined pit, endangers the ground water, a much more precious resource than the copper they hope to extract. If the water tailing storage pit develops a leak, how could it possibly be repaired or even detected before ground water contamination occurs?

I hear there is a very loud smashing and grinding involved in processing the ore on site. Besides the noise, there is an airborne dust created, which, I imagine, is not pleasant to breathe, either.

So, besides the air pollution, water pollution, and

noise pollution, this project plans to operate right next door to the Ladder Ranch, a well known environmental preservation project which, as of Friday the 21st, had a total of 191 visitors this year, with a full schedule of tours for October. The mine is the exact opposite of this immediate neighbor's business, and is absolutely the most ruinous of neighborhood projects imaginable.

The couple hundred local folks proposed to be employed by the mine does not compete with the money that hundreds of tourists a year consistently spend on local hotels and restaurants so they can observe and appreciate the amazing and beautiful natural landscape and wildlife that New Mexico is known for, and that our children will inherit for generations to come.

The short term thinking of the bottom line of this mine will dry up our local wells with an outrageous number of gallons of water usage. Where will we be then?

Ecotourism will endure forever if we protect this sustainable industry.

Thank you

RHONDA BRITTAN

TRUTH or CONSEQUENCES, NM

the

NEW MEXICO BUSINESS COALITION

Comments for Copper Flat Mine NMED Groundwater Discharge Permit Hearing

My name is Ray Irwin. I am a registered professional geologist currently serving as Exploration Manager for Stella Natural Resources, and I'm here today on behalf of the New Mexico Business Coalition.

As you may or may not be aware, the New Mexico Business Coalition is a grass-roots, statewide, pro-business association. We support job creation and reasonable regulation, which includes granting of the necessary discharge permit for the Copper Flat Mine.

As V.P. of Exploration for THEMAC Resources from January 2012 to December 2013, I planned and supervised all geology related activities at the Copper Flat mine site. As a result, I have specific knowledge and a deep understanding of the project's geology and potential environmental impacts due to planned mining. During and since my time working on the project, THEMAC Resources has expended a very significant amount of time and money to develop a mine plan that will safely exploit the copper deposit at Copper Flat in an environmentally sound manner that complies with all State and Federal regulations, and minimizes long term environmental impact.

You will probably be hearing opposition to this mine that is largely, if not completely emotionally based. My comments will stick to what I know to be a fact. The Copper Flat Mine is going to be a closed-loop facility, which not only minimizes water consumption but also prevents water from leaving the premises except via evaporation. Additionally. a lined tailings storage facility equipped with an impermeable synthetic pond liner will be constructed to prevent water used in the milling process from seeping into ground water while simultaneously the mill tailings are secured by an engineered structure to prevent discharge into nearby drainages.

Since the planned operations of the Copper Flat Mine will be a zero-discharge facility, it will not require a National Pollutant Discharge Elimination System permit from the EPA, which governs surface water discharges. Likewise, under current mine plans and designs, Copper Flat will not need a 404 permit from the U.S. Army Corps of Engineers.

With these plans in place and federal agencies satisfied, NMBC is confident that a Groundwater Discharge Permit approved by the New Mexico Environmental Department would be a prudent step in moving the development of the Copper Flat Mine forward.

From an economic perspective and during the 18 to 24-month construction period, the Copper Flat Mine will generate approximately 1,150 direct, indirect, and induced jobs in the region and the State.

Once in operation, the Copper Flat Mine will generate approximately 275 to 300 long-term, high paying jobs at the Sierra County location; and similar to the construction phase, many more indirect project related service and support jobs in the region and State.

The estimated annual mine payroll is approximately $16 million before payroll taxes and benefits. These anticipated new high paying jobs with good benefits is exactly what Sierra County and New Mexico needs.

The NMBC and I, therefore, ask that your decision on this important issue not be swayed by negative misinformation and encourage you to approve the Groundwater Discharge Permit.

Thank you

NEW MEXICO MINING ASSOCIATION
COMMENTS--PUBLIC HEARING ON PROPOSED DISCHARGE PERMIT DP-1840
FOR NEW MEXICO COPPER COMPANY, COPPER FLAT PROJECT
SEPTEMBER 25, 2018

My name is Michael Bowen and I am the Executive Director of the New Mexico Mining Association ("Association"), whose address is 1470 St. Francis Drive, Santa Fe, New Mexico 87505. The New Mexico Mining Association currently has 18 operator members who explore, mine, produce and refine sand and gravel and other aggregates, coal, copper, humate, industrial minerals, molybdenum, potash, precious metals and uranium in New Mexico. In addition, the Association has over 70 associate members who provide consulting, construction, engineering, drilling, laboratory, legal, reclamation, and other services, and equipment, fuel, power, chemicals and other supplies to the New Mexico mining industry. The Association serves as a spokesman for the industry and is active in representing its members and keeping them informed concerning legislation and regulatory developments. It also serves its members on a wide variety of subjects such as taxation, environmental quality, public lands, health and safety, and education primarily through the expertise of its members and member companies.

According to the latest Annual Report published by the Energy, Minerals and Natural Resources Department, in 2016 the mining industry in New Mexico

reported production values of more than $1.7 billion. New Mexico ranks first in the U.S. in potash production, second in copper production, and 11th in coal production. New Mexico was once a leader in the production of uranium and still has large uranium resources that may be mined in the future, market conditions permitting.

Total direct and contract employment by the mining industry in 2016 was just under 5000, with total payrolls over $330 million. Mining jobs are typically some of the highest paying and sought-after jobs, particularly in rural areas. Mining creates many additional jobs in the community, as illustrated by the goods and services provided by our associate members, and other local goods and services provided to our mine employees. Since most mining operations are located in rural areas, these jobs are critical to the local economies where the mines operate.

Minerals are vital to everyday life. All of our electrical energy is supported by mineral production, including electric power generated from coal, uranium and oil and gas, as well as renewable power generation that requires steel and copper and other metals for wind towers and motors; steel, copper, silver and other metals for photovoltaic cells and solar installations; and copper, steel and other metals for transmission lines. Potash and other fertilizers are essential to produce our food, and our roads and buildings for homes and businesses cannot be constructed

without aggregates. If these essential minerals are not being produced in New Mexico, they must be produced somewhere else. New Mexico might as well enjoy the economic benefits of mineral production as well as the everyday benefits that consume minerals. As the Legislature said in the Mining Act, the exploration, mining and extraction of minerals is vital to the welfare of New Mexico.

I believe this is the first public hearing held on a proposed discharge permit under the Copper Rule. The Copper Rule was adopted by the Water Quality Control Commission in December 2013 pursuant to the New Mexico Water Quality Act. Since then, the Copper Rule has been scrutinized and upheld on appeals to the New Mexico Court of Appeals and the Supreme Court, in each case by unanimous decision. The Copper Rule implements legislation passed in 2009, so the Copper Rule has been backed by all three branches of New Mexico's government. The Copper Rule specifies detailed requirements for the design, construction, operation, monitoring and closure of copper mines to protect ground water quality. These requirements are based upon experienced gained under discharge permits issued over nearly 40 years.

I am impressed by New Mexico Copper Company's plans for the Copper Flat project. New Mexico Copper has worked tirelessly to satisfy the requirements of multiple federal and state agencies, including BLM, the U.S. Fish and Wildlife Service, the Environment Department, and the Mining and Minerals Division.

While this hearing is limited to consideration of the requirements for a ground water discharge permit, the mine plans reflect the need to comply with a myriad of environmental protection laws. These plans have taken years to come to fruition at a tremendous cost, representing New Mexico Copper's investment in the development of New Mexico's mineral resources. I am happy to see that the Environment Department has issued a draft permit based upon the Department staff's conclusion that New Mexico Copper's mine plans appear to meet or exceed all of the requirements of the Copper Rule and the Commission's regulations. With the permit conditions proposed by the Department, the Copper Flat project will be operated in a manner that protects ground water quality.

As I previously discussed, development of New Mexico's mineral resources provides many local and statewide economic benefits and employs many local residents. Issuance of a discharge permit for the project will be a great step forward to realizing the important benefits this project will provide in terms of employment, revenue for local and New Mexico businesses, and substantial contributions to state and local tax revenues to support our schools, roads, and other government services.

Many years have been spent and countless dollars spent for experienced engineers, scientists, and other experts to develop the plans for the Copper Flat project. These plans must comply with the myriad of federal and state laws and

regulations imposed on mining projects to ensure protection of public health and safety and the environment. Nevertheless, project opponents seek to distract from all of these protections by creating imagined scenarios intended to scare the public and exaggerate the risks. Many of these perceived risks have nothing to do with the Copper Rule, ground water protection, and the matters at issue in this hearing. I urge the Hearing Officer and the Department to focus on the requirements set out by the Water Quality Control Commission. Other matters, such as dam safety requirements and water supply issues should be left to consideration by the agencies assigned by the Legislature to consider those issues.

Approving DP-1840 will be good for the state and local communities, and will send the right message to mining companies that are willing to invest significant resources in promising projects such as the Copper Flat Mine. For these reasons, on behalf of the New Mexico Mining Association, I urge you to approve Discharge Permit DP-1840 after considering all relevant testimony and comment.

Mike Bowen

Public hearing comments on Copper Flats Mine

September 24, 2018

Good morning. I am Dr. Kathleen Blair. I am a resident of Hillsboro and have owned property there for 10 years. My Pd.D. is in Zoology with a specialization in Ecology, particularly the impacts of natural and human caused changes in natural processes to ecosystems. I have taught a wide variety of university courses as an assistant professor in ecology, environmental biology, botany, and wildlife biology and management at Central Missouri State and West Texas A&M universities and as adjunct at Texas A&M. For the last 20 years I have been the ecologist for the U.S. Fish and Wildlife Service at the Bill Williams River NWR which is located downstream of the Bagdad Copper Mine. Consequently, I have professional expertise as well as a personal interest in the results of this discharge permit hearing for the Copper Flat Mine.

Copper and other minerals it is found in association with as well as many by-products of processing, have been found highly toxic in multiple studies. As a result, I have 4 major concerns I do not believe have been adequately addressed relative to this discharge permit:

A) Federally protected migratory waterfowl and New Mexico wildlife species of concern will be attracted to this extremely large, increasingly toxically contaminated water of the settling/evaporation ponds and pit lake as they have been to many similar features in mines in Arizona and throughout the desert west. This has resulted in major deaths of wildlife and high costs in fines and remediation for the mines. I see no provision for preventing this from occurring.

B) Due to the toxicity of copper, as well as ancillary contaminants, any discharge from the catchment basin into surface or groundwater regardless if accidental human error or a natural event in excess of your current parameter estimates could be severely damaging for people, wildlife, and plants in the watershed downstream of the mine. Such impacts would include the rural residents of Animas and Percha watershed, the town of Caballo, Caballo Reservoir, Percha Dam State Park and potentially into the lower Rio Grande mainstem. This would likely last for decades, or perhaps in perpetuity, as it has elsewhere. Naturally occurring contaminants released or exposed by mining activities and not considered in these documents may well prove to be the most damaging of all even as mercury from the Bagdad has contaminated Alamo Lake, one of the top bass fishing lakes in Arizona, until the fish are frequently found to exceed human safe consumption levels. Effects on other wildlife has not been as well tracked.

C) Copper is necessary in small quantities for healthy plant development but can be highly toxic in higher concentrations especially in water as noted by recent concerns for copper as well as lead in public water supplies. It is the primary algaecide, fungicide, and herbicide for aquatic application. Wind driven dust from the massive tailing piles and the dry sediments from the evaporation ponds carrying copper, as well as other companion contaminants, may easily affect the people, wildlife, and plants downwind. Once rain carries the contaminated dust to the ground it enters the soil where plants and critical mycorrhizal fungi can uptake it and be damaged and killed. Without those soil fungi communities restoration will not have good success. It not an accident that the land and hillsides around such towns as Globe, Bisbee, Santa Clara, and Bagdad look like they have been sterilized. They have been. And ask Ottawa county

Oklahoma about making the deadly mistake of using mine tailings on roads and infrastructure projects.

D) Climate change has not been adequately addressed in my opinion.
   1) Projections of increasing temperatures in New Mexico for the foreseeable future will result in higher evaporation rates than projected. This will increase the contamination concentration in the settling basins and pit lake especially when combined with the recycle/reuse process. Higher evaporation rates will also speed the exposure of toxic sediments as dust which becomes airborne for distribution downwind to contaminate air quality in the air and the watershed after rain.
   2) Flash flood potential will be increasing over the time this mine is projected to function. Although overall the weather pattern is reliably projected to increase drought overall, rain events resulting in increased severity of flash flooding is projected to increase and has begun to be documented in many locations in the western US. This will be further fueled by increasing forest fire frequency and severity altering the watersheds to further increase flooding. Such ecosystem processes require many decades to regain the ability to temper heavy rain fall. Hurricanes in the Gulf of Mexico are projected to increase in intensity and some of those impact New Mexico such as the massive flooding from Hurricane Dolly in Ruidoso 2008 proved as well as hurricanes crossing Mexico from the Pacific bringing high rainfall. Should any feature holding or directing contaminated water including the permanently and increasingly contaminated pit lake be overtopped, eroded, or fail at any time during or after mining activities, the downstream flow of heavily contaminated and sediment would damage property and water resources potentially as far are Caballo Reservoir and the lower Rio Grande, perhaps permanently. There are certainly many, many examples of both mine retention ponds being over topped, failing due to flooding, and accidental release due to human error. I see no provision for an emergency retaining structures to protect the downstream watershed from any of these events during the life of the tailings storage ponds until it is fully reclaimed or afterwards should closure sealing fail, or for the pit lake at all. The pit lake will be a permanent pollution machine.
   3) Species and genetics of plant community chosen for restoration. Has anyone done a botanically valid flora of the area to enhance success? Worked with universities? New Mexico Plant Material lab? In light of climate changing the vegetation?

Kathleen Blair, Ph.D.

PO Box 494, Hillsboro, NM 88042

575-895-5159

In the matter of Copper Flat Mine's Discharge Permit 1840, Docket No. 8WB-18-06(P)

First I would like to read part of New Mexico's Constitution that I feel is important to granting this discharge permit.

Article 22, Section 21 of the Constitution of the State of New Mexico says, **"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare. The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."**

I would ask if leaving 700 vertical feet of steep pitwalls after mining 'protects' the state's beauty or health. This seems to benefit TheMac and NOT the people.

Second, I am confused about letting this Discharge Permit go through at this time as the Australian company that owns the mine has not yet secured enough water to allow it to function more than 1 1/2 or 2 months of a year. If they cannot secure more, that means their 11 years of working time would extend way into the future. My concern is, trying to learn from the history of like mining, would they even be in business so many years down the road. I would ask that this Discharge Permit not even be considered until the mine has secured enough water to function.

Third, I am told the Reclamation Bond of 54 million dollars the mine suggests has not been legally set and I again ask that the Discharge Permit not be considered until a Reclamation Bond is in place.

I wonder if this entire hearing is not putting the cart before the horse and to whose advantage is that?

Respectfully submitted,

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

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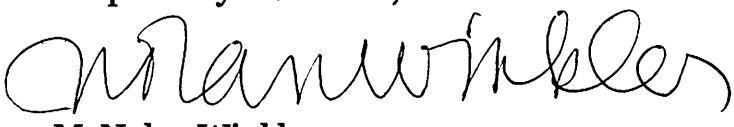

M. Nolan Winkler
Vice President of Hillsboro Mutual Domestic Water Consumer's Association
10822 State Road 152
Hillsboro, NM 88042

Hello. My name is Dan Lorimier and I'm a 40 year resident of Sierra County where I live rurally. I have installed and maintain a private water well to supply my home and property.

Thanks to the Department for holding this public comment session and thanks to the Hearing Officer for formalizing it.

I was involved in the development of the 'Dairy Rule' stipulated agreement with this agency and the NM dairy industry in 2013-14 and 15. From that work, I developed a sense of the importance of synthetic liners with leak detection and recovery. I also became familiar with the problems associated with monitor wells and their after-the-fact pollution detection nature.

I oppose this Groundwater Discharge Permit as drafted and here is one reason: Originally, NMCC planned a double liner system with leak recovery between the two synthetic liners. So, they would have installed a gravel bed, a bottom plastic liner, an under-drain leak collection system plus leak detection sensors, a top plastic liner and then the tailings. The current plan, which is allowed by our new copper rule, calls only for a bed of gravel to hold a single synthetic liner and the tailings. It would also have a very mysterious component - an 'under-drain' collection system installed above the liner. The Department should ask how the planned system could capture and recycle leaks *above* the synthetic liner when its purpose is to recapture leaks between two synthetic liners.

What this plan calls for is actually an 'above-drain' water capture system that pumps water that's inside the tailings pond, to be used for production purposes. Nothing is there to prevent pollution that has made its way past or through the liner from entering the vadose zone and then the groundwater. Rather than prevent groundwater contamination, this plan proposes to install monitor wells. And, if pollution is detected, the company would install 'interceptor wells' to pump up and treat the polluted water. Is their financial assurance sufficient to cover these formidable potential expenses?

With wide agreement that the unlined tailings pond used in the past is currently causing groundwater pollution, shouldn't the Department require this Company to install 'interceptor wells' to treat the existing contamination at the outset of their production phase in addition to their planned monitor wells? Shouldn't this Company install these wells in anticipation of groundwater pollution from their single lined 'dumb' tailings pond that has no leak detection or under-lagoon pollution recycling capacity?

Again, I oppose this plan and this draft permit as written. The department might still fold together their mission to protect and improve our New Mexican groundwater quality while regulating a New Mexican industry as sanctified and ultra-legal as copper mining.

Thanks.

My name is Veronique De Jaegher. I live locally in Kingston. I am opposed to the granting of the Discharge Permit (Docket No. 8WB-18-06(P)) for many reasons...

I am concerned about the interceptor system around the dam of the tailings pond, a ring of wells that pumps groundwater back into the pond if contamination is detected in the monitoring wells.

Are there enough monitoring wells to detect all the contamination?

If the water if flowing fast, can't a stream of pollution go between the monitoring wells undetected at the wells?

The same questions can be asked about the interceptor wells.

How do they know if all the contamination will be captured.

How close do they have to be to each other?

How deep do the wells have to be?

Have they tested or even designed the system? If not, who will design and build the system if NMCC is gone, i.e., during reclamation.

Does the money NMCC leave with the state for reclamation include funds for an interceptor system that might be needed if after closure the monitoring detects contamination?

NMCC SAYS IT WILL CREATE 270 JOBS OVER 11 YEARS...I know that this issue is not germane to the granting of the Discharge Permit, but the issue is repeatedly brought up by the mine's supporters,

- First, in the contract that binds NMCC with the Jicarilla Apaches it is specifically stated that "NMCC will give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities" So those jobs won't be local employment...

SEE ARTICLE 21

POLICY STATEMENT ON INDIAN PREFERENCE

21.0 As an employer, the Nation seeks to employ individuals who possess the skills, abilities, and background to meet the employment needs of the tribe. As a sovereign Indian tribe and a unique cultural group, the Nation promotes preference for qualified Indian individuals in employment. Accordingly, the Nation has established Title 23 in the Jicarilla Apache Nation Code for hiring employees to provide services that meet the needs of the Nation's people. NM Copper hereby supports and endorses the policy of the Nation and shall reasonably consult with the Nation to give preference in employment to members of the Nation and to maximize utilization of tribal members in all available employment opportunities. It is the intent of NM Copper to build a core group of skilled labor candidates through job placement and training assistance to eligible enrolled members of the Nation....

- Second, that employment would be temporary because of the "stop and go" mining due to fluctuation of copper price and not enough water.

What happens to all those jobs when the mine temporarily closes??

Thank you for your attention.

Véronique De Jaegher
HC 69 Box 101
Hillsboro, NM 88042

Good evening, I am Nichole Trushell of Kingston. I am a biologist and have lived in the southwest all of my life.

As a resident of Kingston, why I am concerned -- this project is not located in my *backyard.* I care because if the **Discharge Permit** is granted, wheels will be in motion for stunning quantities of un-reclaimable water to be used, for toxic chemicals to be released from the soils, and for life-supporting waterways to be threatened. Groundwater would likely be impacted, as would Animas Creek, a unique ribbon of LIFE running through our dry landscape. The lives and farms of local people, many of whom have lived in along the Animas for decades, could be irreparably damaged. And, of course, the Animas flows into the Rio Grande.

Deciding in favor of this permit is wrong, key reasons for me:

1. The toxicity of the massive amount of waste material and its permanence. Serious questions: How can long term management of the liner be assured? Who truly understands the effects of the underlying geology? Who will monitor this area and the potential for devastating contamination for generations to come? Who monitors it now? Where are those reports? Who will respond when system failures occur? Who will pay for long term care?

2. The monumental use and toxification of precious water. The amounts of water proposed for operational needs are preposterous in a dry environment. I noted that a figure of 2.3 BILLION gallons of water was requested by NMCC for yearly operations. Unlike municipal water, this water will never directly recharge our groundwater – it cannot. Let's quickly calculate: If an average personal water use is say 125 gallons of water a day, this amount of water alone would supply a city of 50,000 people for a year!

3. The economic benefit is very short term and questionable at best. And a FOREIGN company is the greatest beneficiary, not New Mexicans.

In closing:
Allowing this project is a decision with effects long into the future – negative effects. If any of you have precious family, or care about water, you must not grant this permit. This excessive waste and toxic legacy will be yours. The TRUE COST to our water and to our environment is too great. <u>NO PERMIT.</u>

Thank you.

Nichole Trushell M.S.
123 Kingston North Street
Hillsboro, NM 88042

Docket No. 8WB-18-06(P)
Comments on the Draft Discharge Permit 1840 for the Copper Flat Mine before the Secretary of the Environment.

I am opposed to the granting of this discharge permit as it has been proposed. It is the duty of the Environmental Department to protect the health and safety of the people and the environment from the contamination by toxic materials in the ground water. Because there is current contamination that has been known for 35 years, greater precautions should be taked. The 600 acre, 200ft deep Tailing Storage Facility is inadequately protected and monitored as planned. The proposed underdrain system does not satisfy the Copper Rule which specifies a tailing seepage collection system. NMAC 20.6.7.22A(4)(d)(v) because it is above the liner and does not catch contaminants going past the liner and into the ground water. To do that NMCC should be required to construct an Interceptor System to function from the beginning of operation with verification that NMCC owns

enough water rights to operate a sufficient system.

Contaminants from this mine threaten both the Percha and Animas watersheds which drain directly into Caballo Lake and the Rio Grand River. It is your duty to protect the lives and livelihoods of those citizens who depend on the quality of these waters.

Finally, no permit should be granted until an adequate surety bond is negotiated and secured. This site has had many owners who have departed under bankruptcy. All promises of reclamation at the end of operations merely that, promises without an adequate surety bond in place.

William Lindeman
HC 69 Box 101
Hillsboro, NM 88042

September 17, 2018

My name is Steve Morgan. I am a Landscape Architect and I live in Kingston, NM.
I perform Living History performances as Aldo Leopold, considered by many as the most important conservationist of the 20th century because his ideas are so relevant to the environmental issues of our time. He is also referred to as the Father of the National Wilderness System, wrote the first book on Wildlife Management, established the science of ecological restoration and authored "The Sand County Almanac" in 1949, which stills inspires many to see the natural world as a community to which we belong.

I speak his words here:
We must quit this thinking about decent land use as solely an economic problem. Instead we should look at each problem in terms of what is ethically and aesthetically right, as well as economically expedient. For a thing is right when it tends to preserve the integrity, stability and beauty of the biotic community.
It is wrong when it tends otherwise.

I strongly believe that if Aldo was aware of this current issue, he would say these words and also remind those involved that the total cost of this kind of economic destruction is never fully calculated. The amount of New Mexico water involved and the possibility of catastrophic flooding and the resulting environmental and economic destruction downstream should heavily outweigh the economic benefit to a foreign company.

I am opposed to granting the DISCHARGE PERMIT for the New Mexico Copper Company.

Thank you for accepting and considering my concerns and thoughts.
Sincerely,

Steve Morgan
Landscape Architect and Aldo Leopold Living History Performer
123 Kingston North St.
Hillsboro, NM 88042
(928) 830-9972

ADD: ETHICAL BEHAVIOR IS DOING THE RIGHT THING WHEN NO ONE ELSE IS WATCHING EVEN WHEN DOING THE WRONG THING IS LEGAL

I live on Animas Creek, and I encourage all of the hearing officers to take a drive up Animas Canyon to check out the magnificient Sycanmore trees - they are 350 to 450 years old - and see what is at stake here. This is not small potatoes -these are the redwoods of the southwest. If you make a decision - any decision- without seeing with your own eyes this incredible perennial riparian creek in New Mexico, then you are derelict in your duty to the people of New Mexico, and to seven generations that follow.

The pitlake and tailings pond that are at issue here are ten to fifteen miles upcreek from my home. The water production wells are even closer. We don't need an expert hydrologist to tell us that water flows downhill. I am assuming groundwater also flows in a similar manner. The last operator of this mine left in 1982. They left behind a tailings pond without a liner which as been leaking contamination into the groundwater for 35 years. Perhaps we have the cart before the horse here ... but I would think that an environment department of the State of New Mexico should perhaps be concerned that there is presently contamination leaking into the groundwater from the existing tailings pond before considering another permit by the same mine to do the same thing all over again!

And what about monitoring wells to monitor the plume of contamination that has already been contaminating the groundwater for 35 years? By NMED's own regulations, there should be interceptor wells in place to pump the contaminated groundwater back into the tailings pond. In order to do this, there would have to be sufficient water available in the interceptor wells, along with the water rights necessary to pump this water. There are no interceptor wells at present. This mine has had nine owners in forty years, and has only been in operation a total of three months in forty years. DUuing these forty years, numerous letters of violation have been sent by the NMED, none of which have been responded to. There has been no bond set to insure that reclamation is adequate. As a private property owner, who will I seek redress from if the groundwater becomes polluted ... do you think I will be able to find anyone to answer the phone? This is all just one big scam - a water grab, if you ask me. The promise of jobs and money flowing into Sierra County is minimal compared to the impact on not just Sierra County, but potentially the whole lower Rio Grande valley. Far more money is generated in the State of New Mexico from tourism than from mining - let's change our priorities. Our Land is more valuable than your money.

Catherine Berger
425 Animas Creek Road
Caballo NM 87931

I am against the Mine. The mine has hired experts to say "don't worry no tailings & the pollution can escape this man-made construction & remediation". The CuCode = NM's ls to protect us. The Mine is in compliance with this. The NM department for the environment thinks that the Cu Code which makes the Mine pay for remediation & monitoring for (25) years after the Mine closes should be responsible for 100 years. The multi millenias happy. our impoverished citizen w/ jobs 4 (15) yrs of mine operation. our INDUSTRY has Au Ag Mo & Cu

This Mine will operate for maybe 15 years making MASSIVE pile of pollution. Maybe the Mine will pay for 100 years of monitoring & maintenance. This pollution will not go away. This is a superfund that hopefully will be contained. This site won't be cleaned up but the pollution will be covered up. That = considered good enough.

Imagine the year 4018 — if all went well for the last (2) millenia is intact. What do we know that was built 2000 years ago that is still functioning as designed? Unfortunately the covered up pollution is probably now uncovered & the pollution = ruining our O_2, Θ, & H_2O shed

Martin Mijal 503-288-3770

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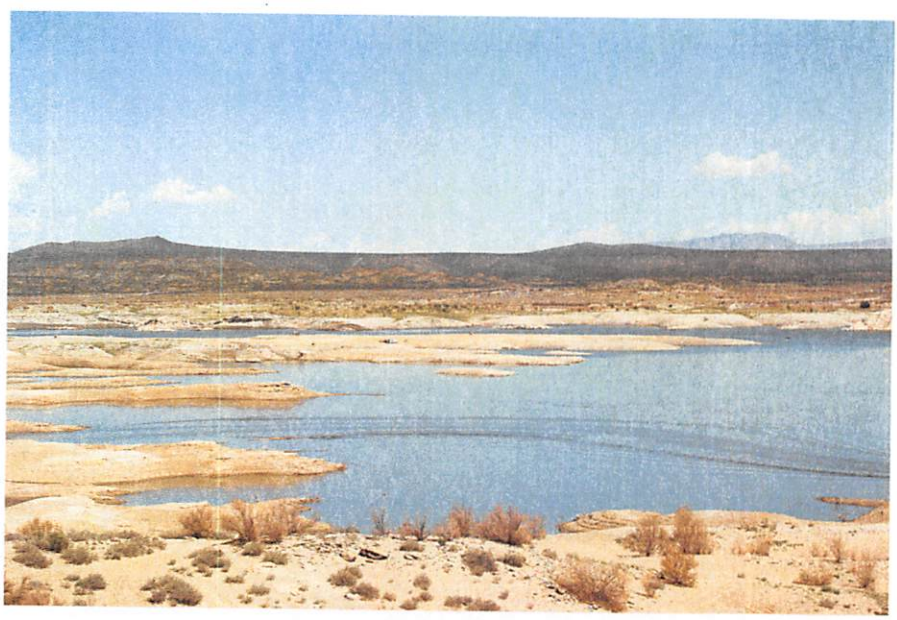
ENVIRONMENT

11 hours ago

As warming strains NM's water supplies, 'status quo' no longer works

By **Laura Paskus**



Laura Paskus

Elephant Butte Reservoir on Sept. 10, 2018, at 3.7 percent capacity. It has since dropped down to 3.0 percent capacity, or less than 60,000 acre feet of water

On the downstream side of Elephant Butte Dam, U.S. Bureau of Reclamation employees navigate a stairwell above the Rio Grande, passing scat from the ring-tailed cats that like to hang out here, and enter through a door into the 300-foot tall concrete dam.

Built in the early twentieth century, Elephant Butte Dam holds back water stored for farmers in southern New Mexico, the state of Texas and Mexico. At full capacity, the reservoir is about 40 miles long and can retain more than 2,000,000 acre feet of water.

Jesse Higgins, an electrician who manages the powerplant at the dam, goes first and flips on the lights, which flicker and fire up after a few minutes. Labyrinthine tunnels burrow throughout, and water drains along the sides of the narrow, elevated path. Inside, it's easy to imagine what the world was like in 1916, when the dam was completed. The Civil War had been over for half a century—nearly comparable to the time between the Vietnam War and now—and the Mexican Revolution was ongoing. Since 1916, there have been world wars and shifting alliances, medical and technological breakthroughs. Humans have visited the moon and landed a rover on Mars. Our understanding of the Earth and humanity's impacts upon it have changed, as well.

But during that time, comparatively little has changed when it comes to how water is managed in New Mexico. The Rio Grande Compact, which divides water among Colorado, New Mexico and Texas was signed in 1938. And New Mexico's water laws today are still based on codes that the territorial legislature passed in 1907.

This story is the second in a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters.

But as the climate changes and warmer temperatures affect the state's rivers, reservoirs and aquifers, the same tactics and strategies that may have helped New Mexicans weather dry times over the past century won't keep working. And perhaps no place in the state offers such a stark reminder of that fact than the reservoir behind this dam. After a dry winter and hardly any snowmelt this spring, Elephant Butte Reservoir is at three percent capacity, storing 58,906 acre feet of water as of September 24 (https://waterdatafortexas.org/reservoirs/individual/elephant-butte).

"Historically, people tend to listen to what they want to hear, rather than what they need to hear: What they need to hear is that our laws do not reflect hydrology and our hydrology is changing for the worse, and if we do not manage it, it will manage itself," says Phil King, an expert on hydrology and the relationship between surface and ground water in southern New Mexico. "I would much rather correct the system ourselves through management than let nature do it's cold, hard reality fix," adds King, a professor of civil engineering at New Mexico State University and a consultant to the Elephant Butte Irrigation District, or EBID.

Stopping the 'death spiral'

EBID serves about 8,000 farmers in the Rincon and Mesilla valleys in southern New Mexico, from Arrey to the border town of Santa Teresa. If you've eaten chile from Hatch or pecans from Mesilla, fed alfalfa to your horses or poured milk from a New Mexico dairy into your coffee, you've consumed water that EBID's farmers divert from the Rio Grande and Elephant Butte or pump from the aquifer.

For roughly a century, EBID farmers have supplemented irrigation water with groundwater. Without it, they would not have survived the drought of the 1950s. But they pumped during the wet years, too, including throughout the 1980s and '90s. Then, beginning around 2003, about four years into the Southwest's current drought period, pumping ramped up even more.

That's a problem, especially in the Rio Grande Valley, where river water recharges the groundwater, and pumping water from the aquifer makes it even thirstier for river water.

With both the surface water and the groundwater strained, the system suffers a double-whammy, King says. That causes a positive feedback or what King calls a "death spiral."

Even though scientists, engineers, hydrologists and farmers know the two are intertwined within the same system, in New Mexico, groundwater and surface water are managed separately. King calls that "hydrological folly."

"We've got some major rethinking to do with New Mexico water law: Status quo is not an option," he says. "I think what people need to understand is we are facing conditions that mankind has not faced here before."

And the only way to reverse that death spiral is to use less water.

Laura Paskus

Chile fields in southern New Mexico

One way to do that, King says, is to formalize a fallowing system that allows cities, factories and businesses—in Las Cruces or in burgeoning border cities like Santa Teresa—to pump groundwater if they pay southern farmers with surface water rights to fallow their fields. Another way is for farmers to reduce their irrigated acreage and grow higher-value crops.

It's clear that any real solutions to cut water use must focus on agriculture. That's because farms use 75 percent of the water in the Rio Grande Basin. Cities can implement conservation measures, and people can reduce their household water use, King says, but the overall savings are minimal. Even finding "new" sources of water to add to the system—like capturing stormwater runoff or desalinating brackish water—will only add only tens of thousands of acre feet, King says. That doesn't come close to making up for the amount of water drought and climate change deplete from the system.

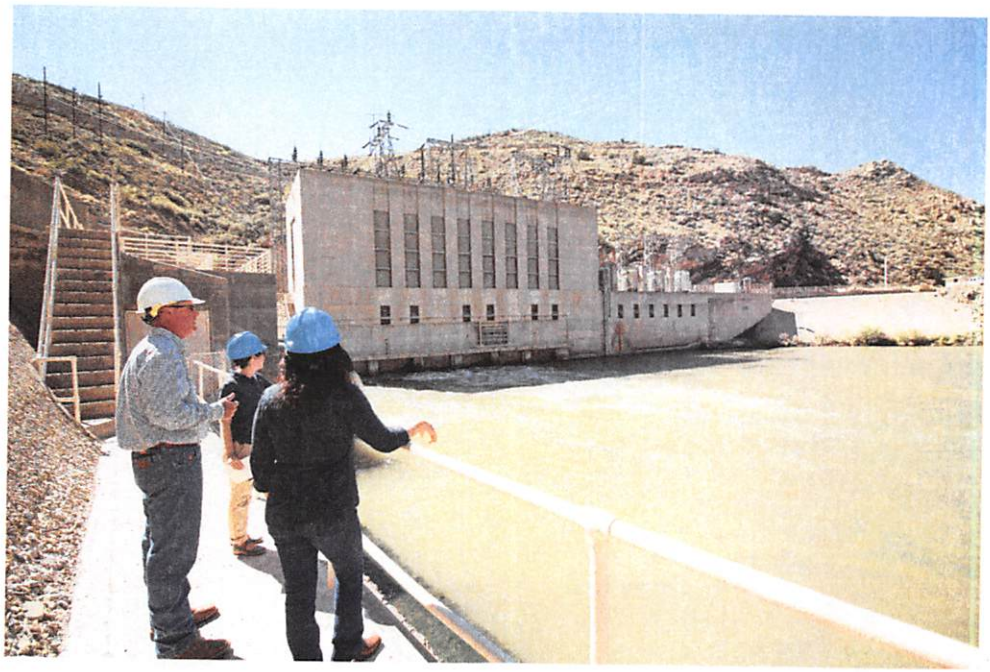
In King's ideal world, water management schemes would reflect the connection between surface and ground water. And water management wouldn't get blown off course by political winds. "I think the handling of water policy, in terms of both promulgation and implementation, needs to be de-politicized," he says. "It needs to be based much more on science, hydrology and the hydraulics of the system, rather than on politics."

Then, rather than each sector—agricultural, municipal and industrial—fighting over every last drop of water, solutions could emerge. And so, too, could changes that protect the river and groundwater system, the economy and people's futures.

'We're going to do everything we can'

At Elephant Butte, Reclamation runs the Rio Grande Project, delivering water each year to EBID, Texas and Mexico. The agency made it through this year, getting water to downstream users, even with record-low spring runoff. Elephant Butte, and other reservoirs, did their job, spokeswoman Mary Carlson has pointed out, (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) storing water from wetter years in the past. Meanwhile, the agency will continue refining its tools and technologies for modeling, forecasting and water delivery to figure out how to make it through next year, and the years after that.

"As you get stressed, you have to look for those outside-the-box ideas," says Yvette Roybal McKenna, with Reclamation's Water Management Division. "We have to find the optimum path so we can move forward and adapt." She says she can't accept a future where the project fails to deliver water. "We're going to do everything we can."



Reclamation has also been studying climate change and its effects on the Rio Grande Basin, which supplies drinking and irrigation water for more than six million people.

Between 1971 and 2001, average temperatures in the Upper Rio Grande Basin increased by an unprecedented 0.7 degree Fahrenheit per decade, or double the global average. And they're expected to rise within the basin by an additional four to six degrees Fahrenheit by the end of the 21st century.

Those rising temperatures will cut the amount of water flowing into the system, as well as the timing of those flows, according to a 2013 report from Reclamation about the impacts of climate change on the Upper Rio Grande Basin. At the same time, more water will evaporate from reservoirs. And plants—forests and crops—will demand more water to survive. All of these factors together, according to the report, "are expected to cause significant changes in the available water supply and demand."

A 2016 Reclamation report also notes that the rivers flows are already insufficient to meet the basin's water demands, and the basin already experiences water supply shortages, even without the effects of climate change.

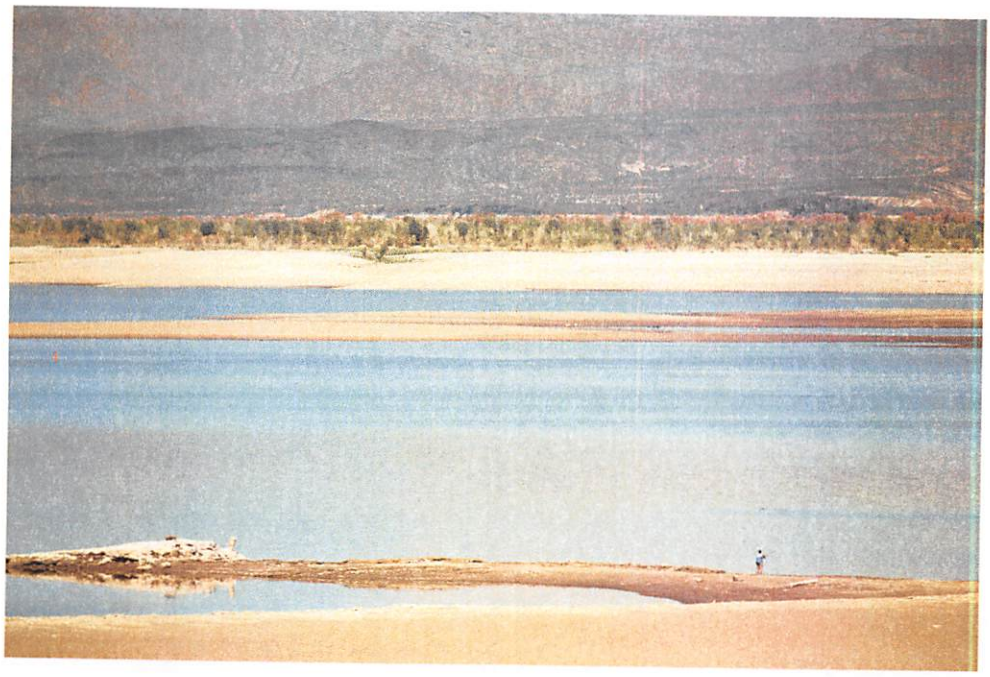
Elephant Butte is 'out of date'

One idea to keep more water in canals and pipes, as well as in the Rio Grande itself, is to stop storing water at Elephant Butte.

"Keeping water in Elephant Butte is a practice I think is out of date, and not wise," says Jen Pelz, an attorney for WildEarth Guardians. Located in southern New Mexico—an arid environment that keeps getting warmer—Elephant Butte Reservoir loses an enormous percentage of water each year to evaporation.

Rates of evaporation vary depending on humidity, wind, radiation, temperature and the amount of water actually in the lake. According to a 2004 report (https://nmwrri.nmsu.edu/wp-content/uploads/2015/research/rfp/studentgrants03/reports/herting.pdf) from New Mexico State University, evaporation from Elephant Butte can be up to one-third of the average inflow each year. Between 1940 and 1999, when inflows to the lake ranged from 114,100 acre feet to more than 2.8 million acre feet per year, annual evaporation averaged about 250,000 acre feet of water.

Warming will only accelerate Elephant Butte's evaporation rate—by another ten percent, according to Reclamation's 2016 report.



That means it's time to change where water is stored on the Rio Grande, says Pelz.

WildEarth Guardians wants the National Academies of Sciences to evaluate existing reservoirs in the basin and run models of how the system would function if water were stored in different places, such as in upstream reservoirs with lower evaporative losses.

Storing Rio Grande Project water—the water in Elephant Butte that Reclamation has to deliver to EBID, Texas and Mexico—in higher-altitude reservoirs would could save between 40,000 and 85,000 acre feet a year from evaporating, according a report from WildEarth Guardians called "Rethinking the Rio." (http://www.rethinkingtherio.org/executive_summary)

Changing where water is stored would mean renegotiating parts of the Rio Grande Compact of 1938. And since federal laws passed during the twentieth century lay out the rules for reservoir operations and water storage, Congress would need to take action.

"People have been talking about reservoir re-operation for a long time, but no one talks about how you do it," she says. "You have to deal with the compact, deal with the reservoir reauthorizations, deal with accountability along the river." If water were stored higher in the system, for example, downstream users would need to know their upstream neighbors weren't diverting their water unfairly.

Making these monumental changes demands building trust and relationships within the watershed, says Pelz. But New Mexico's vulnerability to climate change—revealed so clearly this year—should motivate everyone to start doing things differently.

"For the middle valley and in the south, [managers] delivered all the water for irrigation this year," Pelz says, "And if the reservoirs can't be filled up over the winter, there will be no water for next year."

That's a crisis, Pelz says, for the Rio Grande and for the people who depend upon it.

"Taking concrete steps to do something different means sacrifice: The reality in New Mexico is there are going to be sacrifices, areas that get dried up, and people have to change the way they make a living," she says. "That's the reality of the climate-changed world we live in."

This story is the second of a three-part series about the Rio Grande, its reservoirs and the U.S. Supreme Court battle over its waters. Read Part 1 (http://nmpoliticalreport.com/879547/nms-reservoirs-weathered-this-year-but-what-will-happen-next-year-en/) ***here. You can also read all of our past coverage of the Rio Grande*** (http://nmpoliticalreport.com/tag/rio-grande/) ***and the Texas v. New Mexico & Colorado litigation*** (http://nmpoliticalreport.com/series/texas-v-new-mexico-scotus/)**.**

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February 10, 2017
In "Environmental Project"

Comments

2 comments

Good Afternoon, I am Denise Barrera, General Manager of Sierra Electric Cooperative, Inc. headquartered in Elephant Butte New Mexico. Sierra Electric is a member owned rural electric cooperative serving over 3,150 (excluding City of T or C) members with 4,192 meters. We serve Sierra, Catron, Socorro and Luna counties. 99% of our meters are in Sierra County. We have about 900 miles of line with a density of 4.65, which is meters per mile.

Rural cooperatives have seven cooperative principles that they go by, one being "Concern for Community" – which is one of the highest concerns for SEC, including the economic needs of the members and residents of Sierra County. The NMCC will enhance and provide a unique opportunity for growth and sustainability to the Sierra County residents, surrounding counties and the state of New Mexico. It will offset the existing weak economic conditions our county is currently facing. It will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable critical services for its citizens.

In 1982 when Quintana Mine came on line for a short period, our purchases went from 18.2 million kwh in 1981 to 47.5 million. That is an increase of 29 million kwh. And that was for just a few months of operation.

The NMCC, with a 40MW load at 90% LF would increase our purchases from 65.4 million kwh to 263 million kwh. We are looking at approximately 197 million kwh per year. This would benefit the economic and financial conditions for our members of SEC by reducing the burden on our current rate payers, which 81% are residential. It would allow us to maintain and upgrade our system and infrastructure without having to increase rates or borrow funds and open up opportunities for additional economic development projects.

The SEC Board of Trustees adopted a board resolution in ~~January~~ FEBRUARY 2016 supporting NMCC for its investment and efforts in the development of the Copper Flats Mining Project in Sierra County. Over two years later, we continue to strongly support this unique opportunity for growth and sustainability to Sierra County and state economics.

On a more personal note – I have lived here practically my whole life. I graduated from HSHS. I started my career at SEC. I left in 1987 for a better job. The last 22 years of my 36 years in the electric cooperative business, I drove every day to Deming for work. While working in Deming, I never moved out of Sierra County. I have served on numerous boards and committees. One of which I served 12 years on the local school board. As a member of the School Board, I handed out hundreds of diplomas to graduating students knowing the majority of these kids were going to leave Sierra County for better career opportunities. And those who remain in Sierra County are faced with higher cost of living and lower wages. My son and his classmates graduated in 2004. My son is in Yuma, AZ, he has fellow classmates in Las Cruces, Albuquerque, Santa Fe, Dallas, Nashville. And this is just a few. I could go on for hours on what this mine would do for our community. But in closing, NMCC has demonstrated their commitment to Sierra County. They have already invested millions of dollars in this project. I ask that you please approve the Groundwater Protection Discharge Permit.

Thank you for giving us the opportunity to support NMCC and Copper Flat Mine.

#01-02-2016

BOARD RESOLUTION
Sierra Electric Cooperative, Inc.

A resolution supporting New Mexico Copper Corporation for its investment and efforts in the development of the Copper Flats Mining Project, located within the confines of Sierra County, which will enhance and provide a unique opportunity for growth and sustainability to the Sierra County and state economies.

WHEREAS, the Sierra Electric Cooperative is a Member owned, rural electric cooperative serving over 3,150 members with 4,142 meters in Sierra County and whose mission is "to provide the highest quality electric service, at the most affordable price, and in the safest manner" to our members; and

WHEREAS, the Sierra Electric Cooperative Board of Trustees "SEC Board" has reviewed the information developed under the management of the Las Cruces District Office of the Bureau of Land Management, Draft Environmental Impact Statement and finds it to be comprehensive, complete, and protective of environmental resources while providing economic opportunity for Sierra County and New Mexico, as presented; and

WHEREAS, the "SEC Board" recognizes the importance of regional economic development; and

WHEREAS, one of the Cooperative Principles that guides Sierra Electric is "Concern for Community" and the economic needs of the members of the Cooperative and the residents of our County are of the highest concern; and

WHEREAS, Sierra County is endowed with natural resources including copper which is an important industrial element used in infrastructure development, electrical power generation and transmission; and

WHEREAS, it is the desire of the SEC Board to promote the economic utilization of Sierra County's natural mineral resources in a responsible fashion that will allow local companies to provide additional employment opportunities and local governments the resources to improve and develop sustainable important critical services for its citizens; and

WHEREAS, the economic base of Sierra County will be enhanced through the development of the Copper Flat Mine Project to help offset the existing weak economic conditions being experienced in Sierra County; and

WHEREAS, it is the desire of the SEC Board to support businesses that employ local citizens and utilize proven technologies that provide community safeguards and balance environmental stewardship with mineral and other natural resources production.

NOW THEREFORE, BE IT RESOLVED, that the SEC Board fully supports and encourages the granting of state and federal permits to the New Mexico Copper Corporation as needed to facilitate the opening and continuing operation of the Copper Flat Mine Project in Sierra County.

CERTIFICATE OF SECRETARY

I, O. L Wood, hereby certify that I am the Secretary of Sierra Electric Cooperative, Inc. and I further hereby certify that the above Resolution is a true and correct copy of the resolution passed and adopted by the Board of Trustees of Sierra Electric Cooperative, Inc., at its meeting held on February 19, 2016, at which meeting a quorum was present, and that this Resolution has not been rescinded or modified.

SIERRA ELECTRIC COOPERATIVE, INC. NO STOCKHOLDERS SEAL (SEAL) LIABILITY NEW MEXICO

O L Wood

O.L. Wood
Secretary

I get the impression that some people think this is the first mine in NM

Before there was a Sierra County, before there was a New Mexico, mining was the main trading source of the area, by the Spanish, by the Native Americans, and the inhabitants long before them. Sierra County grew up on mining, because it was blessed with an abundance of underground resources, resources that many others would be overjoyed to have. Nevertheless we are still here, and the area is still beautiful

It's time that our business community realize the enormous value, and the positive economic impact that the Copper Flat Mine will have on our community?
It's time that the advantages and the true facts were seriously considered and appreciated by this community, not the baseless fearmongering and exaggerated hogwash continually promolgated by those who don't want things to change, most especially the ones who consider themselves to be "leaders". These are the people who should be making sure we move forward, and not letting opportunities to improve our economy slip away.
It's time to come down to earth and realize that all things change, they change for the better, or they change for the worse, but nothing stays the same.

The mining industry has also changed greatly, and it is time that the old perceptions catch up with those changes. The technical advances made over recent years affect just about every aspect of the industry, especially the ability to operate a successful mine that is also ecologically responsible in it's operations.

The mine will need several hundred employees, and although local labor will have the chance to be trained for some of the jobs needed at the mine, most of the labor will have to move here because we had little to offer so most of our young people moved away.
If the mine employs 200 workers that come from elsewhere, (and that's a low figure), it will mean about 600 new residents, (includes spouses, children etc.). That is a 10% population increase for T or C, and a 6% increase for the county. These are not retirees, these are mostly people of working age, something we need here.

That will be 400 who do NOT work at the mine, and some will have skills that we really need in our community.From these 400 family members, you can be sure that a good percentage of these will look for work, part time or otherwise, and this will also help bring othere businesses to our area because one of the drawbacks we have had for bringing in new business, has been the shortage of labor, especially skilled labor.
Having a larger labor pool would and drawing more business to our area, will also improve the growth opportunities for our already established businesses.

These new residents will shop, buy gas and use services here in Sierra County, they will use our doctors, our hospital and our clinics. They will go to the cinema, the brewery, etc. and . . . . . and they will need houses and appartments.

There are many here who have the common sense to realize that this is an enormous opportunity for our community. It's time to hear from more of those people and about the positive support for this one time, one of a kind opportunity for Sierra County, instead of nebulous negatives from the repetitive naysayers, who sometimes take a fact, but look to bend and shape that fact out of all reality to fit their agenda. Sometimes they don't even start with a fact at all, they start with an outright lie and go on to embelish that lie.
These people are NOT thinking about the survival of the community, they say these things mostly for selfish personal reasons and to be an anti hero.

We hear continuous complaining about the state of our roads, our water and sewer systems, electric and many other basics that make life comfortable.
That's partly because Sierra County is so very poor, one of the poorest in the US, not just NM. THAT IS NOT GOING TO CHANGE UNLESS WE HELP IT TO CHANGE, AND THIS IS ABOUT THE BEST CHANCE WE ARE GOING TO GET!!

Statement

My name is Robert Byrd, I am a retired engineer living in Las Cruces. My mother's family is from the old Hot Springs area, now T or C, my father worked in mining in New Mexico at Magdalena, and later Grants before moving out of state. I was afforded my own educational opportunities thanks in great part to my father's work in mining.

My concern is that opportunities for today's youth in southern New Mexico are seriously limited by the lack good-paying job opportunities that invest in their communities, which in turn affects the ability of communities to adequately fund education, and pay for infrastructure upkeep, a deadly cycle. Farming is important, but work is seasonal, and generally low paying. Government jobs are often good, but can be easily moved as political winds shift. New Mexico, with its low education rating isn't even close to the first choice for relocating high-tech industry. The Spaceport? Mañana- So why not mining? We have the resources- that other states don't have, we have institutional excellence at New Mexico Tech, and we have a willing workforce that needs high-paying jobs with a future.

I commend New Mexico Copper for their planned mine at Copper Flat. New Mexico has mineral resources that can, and should be developed in a sustainable fashion that are entirely compatible with other important economic activities- farming, tourism, manufacturing, as well as the high-tech fields.

The technical plan that New Mexico Copper has presented details how much water it will use, and how it will be managed. This isn't exotic, untried, or especially expensive technology- but it is modern, and represents the state of the art in an industry that deals with the same concerns across the world. I made some quick comparisons with the water that will be used in the Copper Flat operation, which is equivalent to the same amount of water consumed by a large pecan farm covering two sections of farmland. But the "social benefit" return on that water use in mining vastly dwarfs that in pecan farming- in terms of good paying jobs, local business rejuvenation, tax revenues and potentially follow-on support industries.

I strongly support approval of the necessary permits for the Copper Flat mine.

Statement for the City of Elephant Butte for the New Mexico Environment Department, Groundwater Protection Bureau

for the

Copper Flat Mine Project Groundwater Protection Discharge Permit

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The City of Elephant Butte became New Mexico's 101st incorporated community in July 1998, and is home of about 1,500 full time residents, and hosts as many as 100,000 on key summer holidays that visit New Mexico's largest lake, Elephant Butte Reservoir. In the City's 20 years of existence, we have striven to develop a friendly, safe and diverse community that is open to tourism and a comfortable retirement environment. - County's population overall is going down

As with much of New Mexico, particularly Sierra County and other rural New Mexico counties, maintaining a sustainable City infrastructure has been challenging since our inception, with poor economic conditions state-wide, and a lack of good paying, full-time jobs in Sierra County. With much of our county being Federally-owned, and other large private land holdings, the opportunities for economic development are constrained and challenging.

While we remain hopeful that Spaceport will someday soon develop and provide the economic stimulus that we have been waiting for since its official opening in 2011, this has not yet happened on a scale that has much effect on our economy.

In addition, the drought plaguing New Mexico over the past years, as well as political pressures to provide more and more water to the Mesilla Valley for increased agricultural acreages, as well as to the more water in the Rio Grande River system to the State of Texas and to Mexico, Elephant Butte Lake is currently only about 3% of its holding capacity. This has resulted in fewer visitations to Sierra County and Elephant Butte than virtually any year in our City's existence. This of course increases pressure on our local businesses, and we have seen some of them closing their doors.

While some opportunities can be developed in a variety of geographic locations, a Mineral Deposit must be developed where it occurs. You cannot relocate Ore Bodies.

The Copper Flat Mine Project offers a unique and valuable opportunity to the City of Elephant Butte, to Sierra County and to the State of New Mexico. The Copper Flat Project job opportunities are the kind that communities can build on. Currently, we lose many of our young, bright high school graduates, leaving our communities to education and job opportunities that are not available here. Copper Flat will provide nearly 300 full-time jobs, many of which will be entry level or well suited to many of our local skilled individuals that can operate heavy equipment, drive trucks, work as accountants, engineers, human resource specialists, Safety Professionals, Environmental Professionals, and many, many other opportunities.

These people will live in our communities, and spend their good paychecks on their daily family needs such as food, clothing, vehicles, gasoline and diesel, on an on. They will also pay Federal and State taxes; as well as contribute significantly to the Gross Receipts Taxes that our local municipal and county governments rely on to provide services to our communities.

Like a city or a county or even a state, when a major project is needed, it must be designed and built by qualified professionals. So too does a mining company like New Mexico Copper Corporation (NMCC). NMCC has engaged an impressive assemblage of Professional, Licensed and Experienced Engineers, Hydrologists, Metallurgist's, and others to develop the plans for the proposed facilities for the Copper

Flat Mine Project. Once approved for construction, there will be many opportunities for our local construction companies to play a role in the construction and development of the Copper Flat Mine Project.

Our city, our county and our state all need the Copper Flat Mine Project! The company has done its part, has professionally waded through the myriad of requirements, hired the best they can source to design the facilities so that they will be protective of the Environment during operations and well into the future.....something that was considered in the past. They will also post a significant Bond to assure that the operation and infrastructure is protective during operations and in the future.

We must seize this opportunity for our residents, our communities and for our future. What else to do we have to support our future? Our lake may never reach levels that it has in the past? Spaceport is a great opportunity, but when will it happen for Sierra County?

Without the Copper Flat Mine Project, our future and sustainability of our communities will be a difficult and challenging at best.

The City of Elephant Butte needs and supports the approval of the Groundwater Protection Discharge Permit for the Copper Flat Mine Project, and encourages the New Mexico Environment Department to complete their analysis and issue this permit as soon as possible!

Date 9/26/18

TO: HEARING CLERK
JOHN BACA
ON HEARING BEFORE THE SECRETARY OF ENVIRONMENT

DOCKET No. 8WB-18-06(P)

SUBJECT: IN THE MATTER OF DISCHARGE PERMIT #1840 FOR COPPER FLAT MINE

NAME: LARRY BROOKS desertlb@mac.com
LAS CRUCES & KINGSTON, NM

I AM A NATIVE NEW MEXICAN & LIFE LONG RESIDENT. WORKED IN NM MY WHOLE LIFE. SPENT 37 YEARS IN THE COATINGS INDUSTRY. I HAVE TRAVELED THE ALL OF THE STATE HIGHWAYS FROM JAL TO FARMINGTON CLOVERDALE TO DES MOINES, AND ALL POINTS INBETWEEN. I WORK PART TIME - TRAINING CONTRACTORS IN ROOF COATINGS & REPAIRS. ONE TYPE OF ROOF THAT WE CAN REPAIR IS "SINGLE PLY" (TPO, PVC, EPDM). IT'S SIMILAR TO THE LINING TO BE USED IN TO PROPOSED TAILING POND. THE SINGLE PLY ROOFS ARE USED ON LARGE ROOFS LIKE A WALMART. OFTEN WHEN A ROOF IS COMPLETED THERE WILL BE A FEW LEAKS ON THESE ENGINEERED SYSTEMS WITH PROFESSIONAL INSTALLATION. LEAKS CAN BE LOCATED & REPAIRED BUT CAN CAUSE A LOT OF DAMAGE & MAY HAVE GET MILDEW & BLACK MOLD. THE LEAK MAY

LOCATED & FIX. IF A LINER IS USED AS PROPOSED & FILLED & COVERED WITH THOUSANDS OF YARDS, TONS OF MINE TAILINGS & CRUSHED ROCK & WATER. SHARP ROCKS WOULD PUNCTURE THE LINING AND LEAK. MONITORING WELLS PROPOSED WOULD DETECT THE LEAK. SINGLE PLY SEAMS & PUNCTURES COULD BE REPAIRED. BUT HOW WITH TONS OF FILL & MILLIONS OF GALLONS OF WATER.

WE ARE TAKING WELL WATER & MAKING INDUSTRIAL WASTE & HOPING THE LINER DOES NOT LEAK. HOW CAN IT BE REPAIRED? REMEMBER THE LINER IS UNDER TONS OF TAILINGS AND MILLIONS OF GALLONS OF WATER WHICH ADDS HUGE AMOUNTS OF WEIGHT & PRESSURE. WHEN THIS LINER LEAKS WITH THE NEW INDUSTRIAL WASTE WATER, POLLUTED WATER, WHERE DOES IT GO? I'm FOR JOBS IN THE AREA. HOWEVER, IF THE WATER IN GROUND IS POLLUTED WITH INDUSTRIAL HAZARDOUS WATER. IF WE POLLUTE THE AREA AROUND THE MINE. WHAT IS THE COST to WILDLIFE LIFE, PLANTS, HUMAN LIFE? WHAT WILL THE NEXT GENERATION HAVE IF THEIR IF WATER IS NOT FIT FOR DRINKING?

PLEASE DENY THIS DISCHARGE PERMIT.

= = WATER IS THE BLOOD OF LIFE.

Larry Brooks

BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

Wednesday, September 26, 2018,

My name is Michael Skidmore. I am the owner of Butte Propane Company and I am here today to express my strong, unwavering and total support for the Copper Flat Mine.

Sierra County is my home. I moved here 35 years ago in 1983 from Oklahoma. At that time the copper mine was in full operation, providing good paying jobs for our county residents and much needed tax revenue for our state and local governments. Many other secondary businesses and jobs were also supported by the mine as they provided services and goods to the mine.

When the mine closed in 1985, the economic impact to the county was drastic! Jobs were lost, businesses closed and people moved away. Real Estate prices plummeted. The county experienced a depression it has never recovered from to this day.

What THEMAC Resources is asking is not a new mine in the sense that none has ever existed in our county before, but rather that we utilize the already existing resources that have been successfully mined in the past!

THEMAC has met or exceeded all mine safety and environmental codes and they own their own water. There is no valid reason to deny them the right to operate on land they own.

I see several obvious reasons the mine should be operating.

FIRST: The economic impact to our local community, and indeed, the state government in Santa Fe is obvious! Almost 400 full time, permanent, high paying jobs will generate much needed income for all! The taxes the mine will pay to the state, as well as the taxes paid by the employees will be substantial.

SECOND: Instead of a dying county with aging residents slowly reducing the population, our children can stay in Sierra County and infuse it with new vibrant energy and life.

THIRD: Those who oppose the copper mine are biting the very hand that feeds them! 90% of the automobiles we drive are made from mined metal ores, steel, aluminum, silver, copper, titanium, etc. Those who advocate for electric cars but oppose copper mining are opposing themselves! One can't have cars without

BUTTE PROPANE COMPANY, LLC

PHONE 575-744-5914
EMAIL:buttepropane@outlook.com
After hour #: 575-496-7155

copper! Those who advocate for wind energy but oppose copper mining oppose themselves! Wind turbines need copper, where will the copper come from? A mine! Those who advocate for solar energy surely must realize that solar is impossible without copper!

Computers, cell phones, Televisions, cameras, video equipment, literally every field of technology is dependent on a secure, safe and continuing supply of copper! The demand for copper continues to escalate! In addition to the technical fields' dependency upon copper, our nation's power grid, electrical generating stations, power lines, electrical wiring for homes and businesses all need copper! Even my propane business needs copper for the regulators and tank tubing!

As new technology advances, the need for copper will only increase! It will not decrease!

When America is forced to import copper from other countries to supply the growing demand, not only is the cost increased, our national security is threatened. A country could simply cut off our copper supply and America would grind to a halt!

What good is a valuable natural resource if we are not allowed to use it?

Why not use a resource that is local, less expensive to mine, provides great paying jobs, much needed tax revenues and advance the technological age we live in?

Do everyone a favor and open the mine!

Madam Hearing Officer, I appreciate the opportunity to comment.

My name is Crystal Diamond, I am the director of Sierra Soil & Water Conservation District, a division of state government governed by a board of officials elected by all registered voters within their district boundaries, in our case Sierra County, Socorro County, Catron County, and parts of Dona Ana County.

By state statute, our district is charged with furthering the conservation, development, utilization, flood prevention and disposal of water, and thereby preserve and protect New Mexico's land and water resources.

Earlier in testimony, a representative from Turner Properties spoke of the protection and conservation measures implemented on the Ladder Ranch. The term *pristine water* was reference throughout. Ironically, it was our district and community landowners that seemed most concern for the water quality of Animas Creek when just 4 years ago, the ranch proposed the poisoning of our creek waters, including Rotenone, to kill out all fish inhabiting our steam in an effort to introduce the rio grande cutthroat trout. The poisonous waters would reach Caballo Lake, effectively killing fish species the ranch classified as undesirable, additionally, it was not disputed that protected species such as leopard frogs within the waters would be killed in the process. Impacts to irrigation and livestock waters were unknown, and the community push back was extreme. The project was abruptly halted when federal judges ruled the cutthroat trout did not warrant protected species designation. A ruling that pleased many within sierra county, specifically residents along Animas Creek, who were not pleased at the attempt made by their upstream neighbor to poison their water.

Our orders to promote sustainable conservation through multiple-use practices is a mission we take very seriously, therefor we were not quick to support the opening of Copper Flat mine without first being confident that our land, water, air and wildlife would not be negatively impacted.

Like the Ladder Ranch proposal, the conservation district was equally concerned about the impact Copper Flat proposal would have on our natural resources, specifically water quality. We have carefully reviewed the proposals and studies and called numerous meetings with copper flat representatives, including on-site visits. Our concerns and the concerns brought to us by the many farmers and ranchers we serve, have been thoroughly addressed and alleviated. We are confident that the mine has put in place measures of adequately protecting our waters and land.

It appears the effort to stop the opening of Copper Flat Mine, is not based on genuine concern for the environment. The opposition seems spearheaded in attempt to protect profits generated from an eco-tourism business that relies on "quiet open spaces and views". Sierra County welcomes this business. Just as we welcome the business opportunity of another- to use the land responsibly and wisely, generating profits for themselves while conserving the lands for future land steward.

This mining project has met what is required of them. We urge for their permitting to be granted. Together with the overwhelming majority of our citizens, Sierra SWCD stands in full support of Copper Flat Mine.

Madam chairwoman and all other interested parties in these proceedings, my name is TED CALLAWAY live in Hillsboro NM. According their websites, Themac and NMCC are exploration and development corporations. It is my belief that it is their intent to sell the mine property, which is well within their rights. However, if that is their intent then there is no need for a discharge permit. If they want the permit as part of their development strategy and for marketability I believe that the law prohibits the government from enriching private entities with actions of its own doing. That is, the mine should be saleable as is, if not, then the permit is adding prohibited valuation. Further, if their intent is to actually operate the mine I would like to point out that neither company has any history or experience in operating a mine. As we all know, environmental damage is a probability with all mining operations. To allow inexperienced operations magnifies that potential to an unacceptable degree.

So, on these two points, non-governmental participation and inexperience, I ask that the discharge permit be denied. Thank you.

Ted Calaway

10634 Highway 152

Hillsboro NM 88042

Sierra Electric Cooperative, Inc.

610 Hwy 195 • P.O. Box 290 • Elephant Butte, New Mexico 87935
575-744-5231 • Fax: 575-744-5819
www.sierraelectric.org

Copper Flat Mine Groundwater Discharge Permit Hearing

Testimony of:
John Bokich
President, Board of Trustees
Sierra Electric Cooperative
PO Box 290
Elephant Butte, NM 87935

28 September 2018

- John Bokich, President of the Board of Trustees for Sierra Electric Cooperative
- My background includes:
  - Bachelor of Science and Master of Science degrees in Biological/Ecological Sciences from the University of Texas at El Paso
  - Certified Wildlife Biologist
  - Licensed Contractor in NM
  - Certified MSHA Safety Instructor
  - Certified Auditor, International Cyanide Management Institute
  - 36 years experience as an Environmental Professional in the Mining Industry
    - 8 awards for Excellence in Reclamation, including one in British Columbia and one in New Zealand. Six in New Mexico.

- Sierra Electric established in 1941, now in our 77th year of serving Sierra County
    - About 4,000 members
  - Challenges of an Electric Coop in Southern Rural New Mexico
    - Declining Membership with declining population in Sierra County
    - One of the poorest Counties in New Mexico with a stagnate to declining economy and little Industrial electrical load
    - Aging infrastructure with constant need for replacement and upgrading.
      - Nearly 900 miles of power lines (3 lines - ~3,000 miles of wire)
      - ~14,000 Wood Power Poles
      - Approximately 3,300 Transformers

- Approximately 600 Regulators, Capacitors, Sectionalizing Devices, etc.
- 2 Substations (Cuchillo (1977): 10 MVA / Caballo (2005): 5 MVA)
- A fleet of specialized vehicles, equipment and Safety gear

▪ Primarily a Residential Customer Base, the most difficult type of Base for sustaining infrastructure and service without continually needing to increase rates to Members

▪ Difficulty finding skilled workers, rely on hiring bright locals and providing professional training and then trying to retain them

- Problem with being in an economically challenged County is that we can't pay as much as other Coops with better economies.

o Electric Coop's, like mining operators, rely on professionals to design and construct our infrastructure

▪ Sierra Electric has ongoing requirements to upgrade and replace our aging infrastructure as described above

▪ For large Capital Projects, after they are Professionally designed, it goes to Bid, and is constructed by Licensed Professionals specialized in electrical projects.

▪ Once construction complete, our own highly trained and specialized Linemen and Support Crews monitor and maintain the system, and conduct Maintenance and New small scale Construction Projects.

▪ NMCC has done the same with design of their mine facilities, including the Tailings Storage Facility. It has been designed by **Professionals,** with extensive **Experience** in such operations and facilities. These Professionals rely on their designs and constructed facilities working to protect the environment in order to stay in business.....as will NMCC!

▪ Sierra Electric Cooperative is a Working Example of how when good opportunity for good employment is available in Sierra County, that our local youth, and talented individuals who may be from other areas and like living in Small Town New Mexico, seek out these jobs, work through intensive and professional Training Programs, and improve themselves and build Careers in Sierra County.

▪ This results in Growth to the County, which is what Sierra Electric needs to sustain and improve our service to our Members.

o We have heard a lot of talk this week, opinion, not fact, about the effects of mining on a community.

▪ It is too bad that mining is such a rare industry in New Mexico these days. Mining is a wonderful and unique industry. It is much like a Family as how employees and families feel like member of a Team.

▪ Mining folks work, live and share their lives with Workmates, and establish relationships that last a Lifetime.

▪ Mining is an incredibly Complex, Technical and Potentially Dangerous industry.

- Mining has and continually upgrades a CULTURE OF SAFETY.
  - Like an Electric Cooperative…SAFETY IS NUMBER ONE!
  - Before you are hired, you will be required to take and pass a Drug and Alcohol Test, and Drug Tests will likely be given randomly through the year, or to any individual that has an accident on the mine that could have, or does result in injury to an employee or equipment. This is to protect our Workforce from someone who might come to or be at work in an impaired state.
  - A new employee will go through 24 hours (3 full workdays) of specific training by an MSHA Certified Instructor. All employees work together in these Training Classes…..Administration such as Receptionist, Accountants, Human Resources are in the same Safety Training Class with Haul-Truck Drivers, Bulldozer Operators, Mechanics and Mill Workers. You will receive full pay for any training that you take for Safety, or that is required by your job.
  - Every 12 months every employee must have an 8-hour Refresher Class to be Recertified to work at the mine.
  - SAFETY TRAINING, is not the end of your exposure to Safety at a mine. Every day before starting work, you will have a Safety Tailgate Meeting with your Crew to discuss the day's work plan, any special hazards or conditions that should be avoided or repaired, and more time and site-specific information to ensure that all employs are on the same page.
- In addition, Task Training will be required before anyone, even an experienced Operator, demonstrating that they know how to Safely operate a piece of Equipment.
- Task Training will also be continually offered to inexperienced employees so that they can learn Safe Operating Practices and be available for Promotion.

  - MSHA Safety Training, and the Safety Culture that will be practiced and required at the Copper Flat Mine will make you a Safer Person in all aspects of your life.
    - You will take home your Safety knowledge and culture and integrate it into you family life.
    - No-one in your family will ride in a moving vehicle, not even 50 feet, without buckling your seat belt.
    - You will be proveded PPE (Personal Protective Equipment), e.g. hard hat, reflective vest, hearing protection, eye protection, etc., by the Company. You will likely purchase your own steel-toed footwear.
    - You will teach your family the importance of using PPE around home for chores, and you will likely prepare and keep a kit in

your vehicles for emergencies.....blankets, water, food, tools, etc. You and your family will be prepared!

- As I said previously, a mine functions as a Team. Equipment Operators, Admin Staff, Mill Operators, Engineers, Environmental Dept., Safety Dept., etc., will all function together to operate the mine in a Safe and Planned way.
- The Mine Team will consist of:
  - Admin Staff..... Receptionist, Accountants, HR, etc.
  - Operations....Equipment Operators, Mill workers, Road and Infrastructure Maintenance, Blast Hole Drillers, Blasters, etc.
  - Operations Support....Environmental/Reclamation, Drainage Control, Mine Geology, Surveying, Grade Control, Warehouse, Equipment Maintenance (Heavy Equipment), Mill Maintenance, etc.
  - Management.....General Manager, Dept. Heads, etc.
- The Mine Team is made up of women, men, Hispanics, Blacks, Native Americans, Asian and any other persons legally able to work and live in Sierra County.

- I have been a land-owner in Sierra County, through my parents, since 1961, when they acquired a lot at Hot Springs Landing at Elephant Butte.
  - I was 10 years old when we "got out lot", and in the ensuing 57 years, I was a regular visitor to the area. In 2005, my wife and moved here full-time, and in 2016 I retired here.
  - I have seen many changes Sierra County since 1961, and few are positive. TorC was a thriving place, people were working, stores were open and diverse, things were happening.....good things, and our newspapers weren't full of photo's of people who had been arrested for drugs, murder, robbery, etc.
  - While Tourism is an important component of the future economy of Sierra County, it cannot carry the county on its own, as Sierra County's economy demonstrates.
    - Tourism jobs tend to be Seasonal, Temporary, with little to no Benefits, while Copper Flat jobs will be full-time with Benefits, Training and a future.
    - Tourism in Sierra County centers primarily around Elephant Butte Reservoir. Our lake level is currently about 3% full, as low as it has been in has been in about 50 years. A year ago the lake was about 12% full. With inflow in late 2017 and in 2018, the lake was reduced by 9%. If we don't have a large snowpack in 2018/2019, what is going to happen? Will the lake be at 1% full? Or 0% full. How is that going to affect Sierra County's tourist economy?
      - With ever increasing acreage of pecan trees being planted, a high water-use crop, and desert/riparian lands being converted to cropland, the issue of water with Texas and Mexico, will Elephant Butte ever again be a lake that is the engine of tourism in Sierra County?

- I spent 36 years working in the Mining Industry as an Environmental Manager at several mines in New Mexico, Nevada and Overseas.
    - One notable observation that I had in working at large mine sites over the years is that wildlife species are not driven away by mining, but attracted! Game that is hunted learns that a mine permit area is an area of protection as MSHA does not allow hunting/firearms on mine areas. In addition, many species learn that there are unique habitat opportunities on mine areas. I have noted Rock Wrens actively foraging for insect on recently blasted rock slopes, within minutes of a blast taking place. In addition, active mining areas as well as mine reclamation areas offer diversity to the habitat from surrounding areas, which draws in many species, short and long term.

- As an Environmental Professional in Mining, I have seen and been an Active Member of Mine Teams to plan and manage the construction, operation, environmental management, closure and reclamation of several large Tailings Storage Facilities, Heap Leach Pads and other mine facilities that have similar construction objectives and used the same techniques and materials as those proposed for the Copper Flat Mine.
- I also managed an Environmental Auditing program for a Gold Company, and conducted Environmental Audits on gold mines in the US, Canada, Chile, Brazil, Zimbabwe and Russia.
    - Many of these mines were aged, and yet the tailings facilities and systems were designed, built and operated to rigorous standards, and were protective of the environment.
    - I have never known of a project that I was involved with, that was designed, constructed and operated, as is proposed at Copper Flat, to have failed.
    - The Copper Flat Mine Project has been designed with the most advanced and proven technologies known today, and will use the most advanced and proven materials to protect the environment while providing jobs, training and opportunity to our local youth and working people, and economic stimulus to Sierra County.

- The design, construction and operation of the Quintana Mine in the late 1970's and early 1980's was in a totally different era of mine and facility design, and consideration of the environment, and our science has advanced significantly since that time.
    - When Quintana constructed the Tailings Storage Facility, it only had a clay-type liner and little else to prevent migration of fluids and tailings constituents into groundwater.
    - The result was a relatively small plume of water that did percolate from the TSF into the groundwater below and downgradient of the TSF.
    - I have reviewed data taken from monitoring wells that intersect this plume.
    - While the groundwater samples from the monitoring wells does have some elevated values for some constituents, primarily TDS and Sulfate, the values are not really very high, and there were no samples that showed copper as being above Standards!

        - In contrast, in a report published by NM Tech in 2013, samples taken of water discharged from the TorC Hot Springs District, directly into the Rio Grande River at a rate of about 1 million gallons per day show some sulfate and TDS concentrations well above Human Health Standards.
        - In addition, thousands of tons of ammonium sulfate fertilizer is applied to the crops in the Mesilla Valley, which borders the Rio Grande River south of the Copper Flat Project.
            - A paper in the publication Chemical Geology in 2011, which studied sulfate levels in the Mesilla Valley, concludes that fertilizers containing sulfate were major contributors to elevated sulfate in groundwater, down to depths of as much as 600 feet.
        - Also, water samples reported by the US Geologic Survey in 1998 for the years 1992-95, showed elevated levels of many pesticides and volatile organic compounds and nutrients, which were detected in surface and ground waters of the Rio Grande Valley. With the significant increase of croplands since 1995, what are those values today?
    - I find it hypocritical that there is criticism of Copper Flat potentially affecting groundwater quality....historically shown to be sulfate and TDS, when there is residue of nitrogen (nitrates) and sulfate that leaches into the groundwater of the Mesilla Valley in much greater quantities.
    - In addition, there has been criticism of the design of the TSF and the materials to be used, HDPE in particular. HDPE is used extensively to protect groundwater and the environment. Hazardous Waste Landfills, gold mines containing solutions containing cyanide, and many others utilize this material. HDPE is estimated to last 500+ years. In this application, where there is a compacted sub-base and the HDPE liner is protected from excess pressures by the solution drainage system and from UV light by the covering of tailings, it could well last in perpetuity.
        - And who is to say that the Elephant Butte Dam, which is already 100 years old, is going to last 500+ years, or if it is, that the lake won't be virtually full of sediment with little or no water storage capacity? Without the Elephant Butte Dam, agriculture in the Mesilla Valley will be a remnant of the past.
- NMCC has followed the path that federal and state regulation require, they have engaged highly trained, experienced and professional teams to design a comprehensive project that will protect the environment, generate much needed opportunity and economic benefits to Sierra County, and reclaim the land to a condition better than what it is today.

IT IS TIME TO APPROVE THIS PROJECT AND LET THOSE IN SIERRA COUNTY THAT WANT TO WORK, THAT WANT TO SEE THEIR CHILDREN STAY IN SIERRA COUNTY AND WORK, AND WANT A COUNTY THAT IS ECONOMICALLY SUSTAINABLE, RECEIVE WHAT CAN BE HAD IF THE PORJECT IS APPROVED.

New Mexico Copper Corporation Copper Flat Discharge Permit DP 1840.

My name is Linda Seebach, I live in Hillsboro, NM.

I am opposed to this permit being approved for the following reasons:

I hold a Bachelor of Arts Degree in Social Science from New Mexico Institute Of Mining and Technology (now New Mexico Tech), a Master's Degree In Social Work from the University of Denver, I am a former (now retired) Certified Floodplain Manager (CFM) in New Mexico and also a former NPDES Administrator for the Village of Los Ranchos de Albuquerque NM and therefore am in a unique position to address the proposed Copper Flat Mine ground water discharge permit before you.

I would first like to address the socio economic position of Sierra County. It is true that Sierra County needs jobs and economic income. However, historically, Copper Flat Mine had not been economically viable. Bankruptcy, near bankruptcy, abandonment until sold has been its history. THEMAC and NMCC, who have never operated a mine, would have you believe this is going to change, they have all the answers and history would not repeat itself. This is a projection, not a guarantee.They need $3.00 per pound copper prices to make their needed 20% profit. In the last 120 years the average copper price has been $2.50 /lb. in contemporary dollars. There's never been 12 straight years of over $3.00 /lb. prices.

Secondly, THEMAC and NMCC have put forth hydrological information in a dogmatic position, "This is what is and how it will remain for the next 100 years". They have not addressed the hydrological changes which WILL occur by pumping 7000 + acre feet per year from the aquifer in addition to current usage. Depleting the aquifer by that amount yearly will cause a change in the hydrology of the area. Over a twelve year period, this will be significant.

In their presentation NMCC mentioned briefly a seismology report was required by the OSE, Dam Division, however, there has not been, to my knowledge, a comprehensive study of the effects of the shock waves from blasting over the twelve year production projection and the redistribution of 112 million tons of material within ¼ mile of the Las Animas fault. It is reasonable to question whether the combined mining activities of blasting, machinery vibration, and redistribution of 112 million tons of material would cause fractures in the Las Animas fault and what the results of that fracturing would be.

HDPE liners are considered, for several reasons, always to leak a little (they are specifically said by manufactures to be "water resistant" not "water proof"). The under-drain collecting system

(which normally would be under a top liner to catch the expected leakage) is located above the liner. It is not, in fact, an "under-drain" system, but they still call it that. It is an "above drain" system which functions to capture water directly from the tailings to be reused. Nothing prevents contaminated water that gets past the liner (mostly through accidental punctures, rips, etc. – they have to drive equipment over the liner to install it) from going into the ground and thus into groundwater. This violates the NM Water Quality Act, but the NM Supreme Court sanctioned this violation by saying the Copper Rule's solution to this problem is valid. That solution is to say that if the groundwater is polluted by the tailings pond, that pollution has to be detected by the monitoring wells placed around the TSF, and then the situation is remedied by a network of "interceptor wells" that pump the contaminated groundwater back into the tailings pond thus not letting any pollution downstream. That is why the proposed TSF has neither a real under-drain collection system nor even a leakage detection system.

To respond to these points: a) since NMED knows definitively that the existing tailing pond (which has no plastic liner) is leaking contamination into groundwater and has been for 35 years, NMED should require an interceptor system to operate from the beginning of operations, i.e., it should be in place and not wait until new contamination is detected by the new monitoring wells; b) NMED must verify that NMCC owns enough water rights to operate a sufficient interceptor system; if they don't then the permit should not be issued; c) the location of the so called "under-drain" system does not satisfy the Copper Rule requirement for a tailing pond which specifies a "tailing seepage collection system" [NMAC 20.6.7.22A(4)(d)(v)] because it does not catch the seepage going past the liner into the ground. The Copper Rule itself defines "seepage" as leachates that get into the vadose zone, which is the moist layer of soil above groundwater. The requirement is for <u>under-drain</u> systems.

As a result of climate change, New Mexico has experienced a higher incident of 500 year storm events in the last ten years, two of which have been in the Hillsboro area. In calculating the storm water management portion of the permit, they have devised a "ledge" which would separate NMCC property from BLM property within the proposed pitlake area. In the NM Water Quality Act (NM Statutes Annotated 74-6-1) there is a provision called Limitations (NMSA 74-6-12C) which exempts water that is entirely on private property, that does not combine with other waters, and whose effects are confined to that property. NMCC started resurveyed the land around the pit to show they own all of the pit. However, there is a small portion of BLM land which sticks into the projected future pitlake at the end of operations. The level of the pitlake is going to change according to storm events. The ledge is planned to be three feet above the proposed water level, it will overtop the ledge during a 500 year storm event, as three feet does not allow sufficient freeboard for a 500 year event.

They have not addressed the probability of a 500 year storm which would impact the holding pits of the mine, thus causing the overflow of contaminates into the Greyback Arroyo and on to the Ladder and Hillsboro Pitchfork Ranches. Should the contaminated pits overflow in such a manner, the mine becomes a point source contamination to the Rio Grande River.

In summary, I protest this permit on the grounds of insufficient studies into the above mentioned areas of concern. THEMAC and NMCC are asking you to believe "This is what is, and it will continue to be so". NO it will not continue to be so...there are many variables in the equation that have not been adequately addressed. They are saying, "This is what will continue to be". No, they need to have contingency plans and more detailed analytical studies, instead of their dogma.

Sincerely,

Linda Seebach

Linda Seebach

10634 Hiway 152

Hillsboro, NM 88042

FREEPORT-MCMORAN

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manger, Environmental Service
Telephone: 575-912-5927
e-mail: sburtkes@fmi.com

September 27, 2018

Hand Delivered

Hearing Officer
New Mexico Environment Department
Ground Water Quality Bureau

Dear Madame Hearing Officer:

Re: Copper Flat Discharge Permit DP-1840 Public Comment

Freeport-McMoRan is not a party to this proceeding, though I and some of my fellow workers have attended and listened to this hearing with great interest. Even though Freeport-McMoRan is not involved in this hearing, testimony concerning Freeport McMoRan's mines in Chino and Tyrone has been provided. This comment is intended to correct a number of mischaracterizations and provide additional information for the Commission.

The witness who testified regarding incidents at the Chino and Tyrone mines has no personal knowledge of them, and in fact those incidents occurred before I began working at the mine. Indeed, the most recent incident addressed in the testimony occurred in 2007. Testimony was provided regarding reports and a settlement in 2011 and reference to documents that were developed in connection with that case. These documents were not intended as authoritative evaluations about impacts to the environment from Freeport's current mining operations or even long term impacts from its historical operations at these mines. Further, my understanding is that the process leading to that settlement began in 2003, related to incidents reported in 2000, and covered the entire history of the mines prior to that time and beginning in the early part of the last century. For example, open pit mining began at Chino in 1910, and as you can imagine, mining technology and attention to protection of water quality and the environment has changed dramatically since then. In sum, the incidents you have heard of generally reflect historic mining practices, and our use of modern mining engineering practices and implementation and advancement of regulations by the state agencies ensure that there are few, if any, of these types of incidents in the future.

The current environmental and engineering staff at the Chino and Tyrone Mines takes great care to design, construct and operate our facilities to comply with our permits and laws that protect water quality and the environment. Our permit applications are rigorously reviewed by the professional staff at the New Mexico Environment Department and other agencies to make sure that we are following the rules and doing all we can to protect water quality. That review process involves extensive public engagement including hearings such as this, and is backed up by regular water quality monitoring and ongoing review, both by our staff and the agency.

Both our company and the regulatory agencies have learned a great deal over the last several decades about how to better operate our mines to prevent incidents that can impact water quality. That knowledge is reflected in the Copper Rule, which requires all mines, and particularly new mines, to meet rigorous requirements. An example is the new standards for pipelines and

tanks, which are the source of many of the incidents that have been discussed with you. Indeed, the Copper Rule provides far greater detail of the requirements to protect water quality than was in place before.

I suspect that the witness used public records of the incidents he discussed with you, and those public records are always available for anyone to obtain and review. However, the testimony provided did not cover the full extent of those reports. Spills and other incidents must be promptly reported to the Environment Department and often other agencies, but that is not the end of the requirements. Our reporting must discuss the actions taken in immediate response to an incident for cleanup and to minimize its impacts, as well as longer term cleanup when necessary to restore impacted soils and surface and groundwater to meet standards for water quality protection. Long-term protection of water quality also involves reclamation of parts of the mine no longer needed for production. Over the last ten years or so, we have successfully reclaimed over 5000 acres of tailings impoundments and stockpiles in a manner to maintain their long-term stability. We have also instituted practices for the regular review of facilities such as tailings dams which, along with regular monitoring and reporting to the agencies, is designed to ensure that nothing is overlooked and that these facilities will remain stable and that water quality will be protected during operations as well as long after these facilities are closed.

I hope that these comments will help put the testimony you have heard in perspective, and appreciate your time and attention to my comments.

Sincerely,

Sherry Burt-Kested
Manager, Environmental Services
Freeport-McMoRan Chino Mines Company

Baca, John, NMENV

From: Stan Brodsky <stanandrob@windstream.net>
Sent: Friday, September 07, 2018 11:59 AM
To: Baca, John, NMENV
Subject: Copper Flat Mine Re-opening

I am all for adding several hundred jobs to Sierra County, but the price for doing that seems pretty high. I'm talking mainly about water usage. We are in a draught. Wells are going dry in Hillsboro. The mine has said they need to use about 16-17 acre-feet of water per day, which is over 5 million gallons per day. An average family used less than 1 acre-foot per YEAR.

I am also concerned about pollution of the ground water from contaminated water flowing out of the mine operation. As you know, there will be a hearing on the mine's projected water discharge om 9/24 – 9/25. We'll see what NMCC and Themac have to say at that time.

And then there are a couple of less important, but still important, things. One would be damage to the road on route 152 from the very heavy trucks, and then there is also the question of added traffic to route 152 (trucks and workers). As you probably know, Rt. 152 is a 2 lane road, one lane each way, with no shoulders.

Stan Brodsky

Baca, John, NMENV

From: LeRoy Henderson <elhleroy@yahoo.com>
Sent: Friday, September 07, 2018 10:43 AM
To: Baca, John, NMENV
Subject: Fw: THEMAC is still trying to take advantage of you via Bruce Swingle and a few other morons too stupid to see reality!!!
Attachments: Floccinaucinihilipilification.docx

FYI--- get the truth!!!
----- Forwarded Message -----
From: LeRoy Henderson <elhleroy@yahoo.com>
To: Steve Green <steve.green@torcnm.org>; Sandra Whitehead <sandra.whitehead@torcnm.org>; Kathy Clark <kathy.clark@torcnm.org>; Rolf Hechler <rolf.hechler@torcnm.org>; paul.baca@torcnm.org <paul.baca@torcnm.org>
Cc: Max Yeh <maxyeh@windstream.net>; PAWA TO PEOPLE <pawatothepeople@windstream.net>; pawa@windstream.net <pawa@windstream.net>; Stan Brodsky <stanandrob@windstream.net>; Sophia Peron <jazzinn.peron@gmail.com>; Ron Fenn <fenwron234@gmail.com>; Audon Trujillo <audont@yahoo.com>; Ariel Dougherty <arielcamera@gmail.com>; Walter Rubel <wrubel@lcsun-news.com>; Andrew Oxford <aoxford@sfnewmexican.com>; Chuck Wentworth <cwentworth@gpkmedia.com>; Mike Tooley <mike@torcherald.com>; Bruce Swingle <bswingle@sierraco.org>; Kenneth Lyon <klyon@sierraco.org>; Frances Luna <fluna@sierraco.org>; Robin Tuttle <blackrange@yahoo.com>; John Arthur Smith <john.smith@nmlegis.gov>; John Masterson <john@torc.beer>; Jim Taylor <englecowcamp@yahoo.com>; Rebecca Dow <rebecca.dow@nmlegis.gov>; Goodman, Melanie (Tom Udall) <melanie_goodman@tomudall.senate.gov>; Howie C. Morales <howie.morales@nmlegis.gov>
Sent: Friday, September 7, 2018, 10:32:45 AM MDT
Subject: THEMAC is still trying to take advantage of you via Bruce Swingle and a few other morons too stupid to see reality!!!

This is the truth!!! Copper is not up as it has been stated by THEMAC's new marketing and lobbying firm...THEMAC is and has been on the verge of bankruptcy as seen in the auditor's reports for the past 6 years... they have borrowed, at an exorbitant interest rate, more money than they have on hand... they have only two mine properties... they have no mining equipment... they are buying support through paid by them sponsorships (what is up with that???)... they have inadequate water to do their process... they do not have the money to build their operation at $450 million....Bruce Swingle needs to resign... if the reopening was truly feasible, Freeport would have done it years ago and even before Alta Gold came in and screwed local investors with their similar scam...
If THEMAC could actually do this proposed reopening, they would not have to spend all this time, 14 years, trying to kiss the asses of all the failed, "In Control", "Leaders" of Sierra County who have kept our community from growing... too many lost opportunities while pursuing these P-I-T-S schemes for the past 20 years... Kick them out and keep them out of the City Manager's office... Oh wait...nobody is in that office is there???!!! Kick them out of the County Manager's office, too!!! Share this with as many people as you can... those of you honest enough to!!! Dona Ana County doesn't like the idea of putting the equivalent of a 35,000 resident town at Caballo dam, sucking up their water!!!
ps. Chuck, I am so disappointed in you... still!!! Mike, congratulations on stopping that stupid move on the Armory... the City should move that decrepit warehouse down across from Ralph Edwards Park up to there and build a nice set of restrooms there in its place, with a parking lot to improve the park... time to do some smart things, people!!!

Baca, John, NMENV

From: driftingsand@aol.com
Sent: Saturday, September 08, 2018 8:42 PM
To: Baca, John, NMENV
Subject: Copper Flats

I am a property owner in Truth or Consequences, Sierra County NM and I strongly support opening the mine for much needed jobs and economic vitality for the area.

Sincerely,
Sandra L White

Sent from my T-Mobile 4G LTE device

Baca, John, NMENV

From: Max Yeh <maxyeh@windstream.net>
Sent: Monday, September 17, 2018 11:41 AM
To: Baca, John, NMENV
Cc: Reid, Brad, NMENV
Subject: Hearing on Discharge Permit 1840
Attachments: BEFORE THE NEW MEXICO SECRETARY OF ENVIRONMENT.pdf

Dear Mr. Baca,

Being unable to attend the hearings on Discharge Permit 1840 on the week of September 24th in Truth or Consequences, I am hereby submitting by attachment my comment to be entered into the record of the hearing.

Thank you.

Max Yeh

2018 Comments / Concerns

To: Hearing Clerk, John Baca.
I request that my written comments be added to the record of the Public Hearing.

Secretary of Environment: On the Hearing before the Secretary of Environment
New Mexico Environmental Department

Written Comments Handed in, 25 September 2018, at Public Hearing held in Truth or Consequences, NM

RE: New Mexico Environmental Department
Discharge Permit 1840 – Copper Flat Mine Wastewater Discharge Permit
Docket No. 8WB-18-06(P)

Copper Flat Mine, NM Wastewater Discharge Permit Application
submitted by New Mexico Copper Corp to NM Environmental Dept.
Copper Flat, Located near Hillsboro, Sierra County, NM.

RE: HDPE GEOMEMBRANE Liner for the Tailings Storage Facility (TSF) & any other uses of similar liners for Waste Rock Storage or Water Holding Pond storage, etc.
And other Concerns.

From: Candace Browne
candilight4u@gmail.com
P.O. Box 3642
Truth or Consequences
New Mexico 87901

I oppose granting this permit.
Reasons are listed below.
Thank you for hearing the concerns and questions of the public at this Public Healing.

My Comments/Concerns about any HDPE geomembrane liner system are based, in part, on the **NMCC Mining Plan of Operation,**
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

Printed Material handed in along with my Comments:
Along with my following written Comments / Concerns, I have included **printed** research material:

Geotechnical Construction Quality Assurance (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates (BAS) 16885 West Bernardo Drive, Suite 305 San Diego, CA 92127 ; Prepared by: GeoLogic Associates, same address, San Diego, CA, May 2003 (75 pages)

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants (69 pages)

Layfield Environmental Containment; www.layfieldgroup.com

Source documents not printed include:

THEMAC Resources, New Mexico Copper Corporation, Copper Flat Mine Plan of Operations Report
prepared for U.S. Department of the Interior Bureau of Land Management Lac Cruces District Office , December 2010, Revised June 2011.
NMCC_PoO_191000_03_20111120_FNL.doc.
electronic copy, 358 pages

*United States Environmental Protection Agency Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles

NEW MEXICO COPPER RULE
TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES
20.6.7.1 ISSUING AGENCY: Water Quality Control Commission.
[20.6.7.1 NMAC - N, 12/1/13]
20.6.7.2 SCOPE: All persons

Below are my Comments and Concerns:

COMMENT:
I believe the report listed below is flawed in its estimation of probable leakage from the HDPE liner:
PROBABLE HYDROLOGIC CONSEQUENCES OF THE COPPER FLAT PROJECT SIERRA COUNTY NEW MEXICO, Dec 2017, John Shomaker & Associates, Inc, Water-Resource and Environmental Consultants, prepared by JSAI for THEMAC Resources, New Mexico Copper Corporation

One part of this report is the evaluation of the potential leakage from the HDPE liner that will be under the TSF- tailings storage facility (pond) which will cover up to 600 acres.

Below are some sentences from the SHOMAKER report that seem unsupportable:

'NMCC considers the potential for leaks in the liner to be very unlikely.'

'....the probable hydrologic consequence from a postulated leak in the liner is nil."

3. Potential for groundwater discharge from the tailings storage facility (TSF) and waste rock stockpiles (WRSPs).

TSF and WRSPs

1. Infiltration to groundwater from the tailings and waste rock storage areas is *not expected* due to installation of liner under the TSF and placement of WRSPs on low permeable crystalline bedrock. Any meteoric water that might infiltrate to groundwater is expected to remain in the immediate area for centuries, due to the low permeability of the SFG sediments near the Animas Uplift and due to the presence of flow-inhibiting faults. The impact to groundwater chemistry is expected to be minimal.

3.3.1 Tailings Infiltration
Because the tailings impoundment will be lined, infiltration from the tailings is not expected. However, unexpected sources of potential infiltration include manufacturing defects in the liner and other holes, in the liner and along the seams, developed during placement.

2. NMCC considers the potential for leaks in the liner to be very unlikely. Nonetheless, the potential occurrence of leaks in the tailings facility liner was evaluated based on previous analyses presented in Appendix B.

3. *** page 44: An assumed liner leak occurrence for the purpose of evaluation is one circular defect per acre, with a standard defect area of 1.0cm^2 (corresponding to a round hole diameter of 1.128 cm). The rate of leakage through the defect, assuming a compacted bedding layer beneath the liner and an underdrain system above the liner (Golder, 2016), is given (Appendix B, equation 1) by (a formula) (please see this page for more on this concern)
(end of Shomaker statements)

I did research to see what other professionals have to say about the 'off chance that an HDPE liner will get 'holes' that leak.
How many holes and how much leakage and Why?

Below is the research I found that leads me to believe that the Shomaker report **is flawed in its estimation of probable leakage from the HDPE liner.**

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants, **gives information that is contrary to the SHOMAKER conclusions.** (This document is printed and handed in within my notebook at Public Hearing)

Page 3: No leakage is a great objective, but is not usually realistically achievable.

Page 4 Monitoring and interpreting leakage rates can indicate when a problem has occurred and this can be mitigated before it impacts the environment significantly.

Page 10 How ***NOT*** to estimate leakage rates:
1. Obtain facility information.
2. Undertake *minimal* liner design

3. 3A. Calculate likely range of leakage for minimum liner design from *old literature*, do not consider chemical compatibility, *assume materials, construction, etc will be ideal, etc.*
4. Use the low leakage rates chosen in the RISK ANALYSIS without stating assumptions.
5. Get approval and file it.
6. Do not include assumptions made regarding materials, construction, protection, operation and rehabilitation into subsequent documentation (design, tender, *construction quality plans, operating manuals*, etc)
7. Do not appoint specialists to construct liners
8. *Do not undertake construction quality assurance*
9. *Do not monitor leakage rates nor compare with assumptions used in Risk Analysis*

Page 12:
Mentions leakage rates from Giroud (1989)'
Giroud's formula is what I believe SHOMAKER used.

Page 13*: **Explains mistakes made in the above example***
"The literature you've used is from 1989, and parts have been superseded"
In this section more mistakes are explained.

Page 16:
The proper way to do it is:
You need to use recent literature for liner leakage equations.
(Realize) Not all liners are the same.
The leakage rate range used in Risk Analyses should be calculated by specialists who understand what affects liner performance – head on liners, chemical compatibility, material Specifications, construction specifications, construction quality assurance, operational risks and requirements, rehabilitation risks and requirements, etc.
Assumptions must be carried through to the design, material specifications, construction, operation and rehab phases.
Calculate leakage rates for dams separately.

Page 30:
These formulae (in literature shown below) **do NOT take account of geomembrane *wrinkles.***
Beware-some modeling programmes use these formulae
Giroud, J P and Bonagarte, R (1989) Leakage through Liners Constructed with Geomembranes – Part 1. Geomembrane Liners. Part II Composite Liners Geotextiles and Geomembranes, Vol. 8 No's 1 & 2

Page 31: Rowe and Booker (1998) developed formulae that included transmittivity effects between a geomembrane and underlying clay/GCL, and took the thickness of the clay layer into account, and wrinkles.
Rowe, R.K. and Booker, J.R. (1998) Theoretical solutions for Claculating leakage through Composite Liner Systems. Geotechnical Research Centre Report GEOT-18-98

Page 33: Rowe (2005) again presented calculation of leakage through composite liners, taking linked, linear wrinkles into account.
These calculations provide a much more ***realistic*** range for leakage from composite liners than 1989 calculations.

Page 51: Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles
Addition of sub-section 3(5)
'A competent person must recommend a pollution control barrier system suitable for a ***specific*** residue stockpile or residue deposit on the basis of a Risk Analysis as contemplated in regulations 4 and 7 of the Regulations."
So you can have a non-engineer recommending your pollution control barrier system, sho doesn't know what he/she doesn't know. Same applies for engineers (who) don't understand the complexities of liner performance.
(end of excerpts from this pdf)

There are many more comments in this document that support my concern.
I believe if you study this additional analysis, you will find that the SHOMAKER Conclusions need reassessment and the PERMIT should **not** be based on any CONCLUSIONS using ***outdated*** methods and therefore the PERMIT should not be approved.

This next document 'Geotechnical Construction Quality Assurance Plan" is an excellent example of a precisely detailed CQA showing how it is meant to be set up, carried out, and reported. This is what I believe is necessary for NMCC to show that they are willing to implement for their HDPE liner construction.
Geotechnical Construction Quality Assurance (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates (BAS)
(document printed (75 pages) and handed in within my notebook)

Without this sort of detailed plan for NMED to inspect, I believe the WASTEWATER DISCHARGE PERMIT must be denied.

CONCERN
NMCC Mining Plan of Operation,
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

The **GOLDER** design report, page 1, states *'NMCC has commissioned Golder Associates Inc (Golder) to develop the conceptual design of a new tailings storage facility (TSF) (for the Copper Flat property near Hillsboro in Sierra County, New Mexico).'*

On page 3 **GOLDER** states: *'...the ore reserve has been increased from the 60 million tons identified by Quintana, to approximately 100 million tons.*
Ore will be mined at a rate of 17,500 tons per day (tpd).

'The GOLDER report presents the conceptual design of a tailings storage facility (TSF) capable of supporting tailings disposal for the currently identified ore reserve.'

On page 4 **GOLDER** states: *'Tailings will be delivered at a rate of 17,500 tons per day(tpd) at an anticipated solids content of 50% by weight.*

At 92 per cent availability, the annual tailings deposition rate will be 5.88 million tons.'
[Personal added computation: 5.88 per year x 17 years = 99.96 million tons of tailings sitting on the 514 acre TSF with its 0.80 inch thick HDPE geomembrane liner.]

Questions about Concerns:
Will this Golder TSF design be adequate for the newly Proposed Alternative, Alternative 1 or Alternative 2 now delineated in the November 2015 DEIS?
These new alternatives will speed up to almost twice, the amount of the tailings tpd production daily (from 17,500 to 30,000 tons) as the mining & milling process proceeds 24/7, 365 days a year.

How will this speed up of tons per day (tpd) of tailings material impact the ongoing, *field construction of the liner?*

The new Alternatives change the liquid portion of the tailings to a higher content of water. Will water drain through the tailings more quickly? Will this put additional strain and pressure on the underdrain collection pond ?
How will this extra water affect the supernant pool within the TSF?
What will happen if there is a storm event? Will there be adequate extra storage capacity for the extra water taking into consideration the extra water used to mill the ore using Alternatives 1 & 2?

CONCERN

GOLDER Drawing 6 Notes state: *'Drawings present the conceptual design of a new & expanded tailings storage facility with a capacity of 100 million tons at an assumed dry density of 85 pound per cubic foot.*

GOLDER on page 6: **3.4 TSF Liner System** the Report states: *'The TSF liner will consist of an HDPE geomembrane placed on a minimum 6-inch thick layer of liner bedding fill.*
Beneath the starter dam and embankment underdrain, an 80 mil (0.80 inches) geomembrane is proposed
while within the impoundment interior, the geomembrane thickness will be ***60 mil.***
The underdrain collection pond liner will consist of a lower 60 mil and upper 80 mil HDPE geomembranes
separated by a drain net. '

On page 3 **GOLDER** states options: *'Utilize existing tailings (from Quintana's 3 month 1982 mining venture) as fine grained bedding fill for the future TSF geomembrane liner*
(Or)
Place existing tailings inside the new TSF on top of the new geomembrane liner.'

On page 4 **GOLDER** states: *'The TSF can be constructed in a phased manner.'*

These are **all the details about the HDPE geomembrane liner** given by Golder Associates.

This seems **inadequate** to provide needed detailed information for the NMED to make an informed decision about the WASTEWATER PERMIT. I believe the PERMIT should not be approved.

CONCERN

As stated by one company in the geosynthetics industry, *'It is normal practice to completely track all materials from manufacture to final inspection; qualify technicians and welding equipment each day before welding and every 4 hours after that; and to test each and every seam made in the field.' [Layfield Environmental Containment; www.layfieldgroup.com]*

Within the United States EPA Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles (EPA Guide); *'Section VI discusses **construction quality assurance and quality control'*** Additional references on this will follow.

In the NMCC Mining Plan of Operation & the DEIS there are:
No specifics about exactly which **resin** will be used
nor any detailed information about testing of the geomembrane rolls for defects,
manufacturing requirements,
installation requirements,
qualification of the Company hired to do the manufacturing nor the installation,
no detailed plan for ground preparation
no detailed plan for installation over the gradual increase of the footprint of the TSF over the years the mine is producing tailings.
ETC.

Questions about this Concern:

If Golder Associates does not handle HDPE geomembrane liner manufacture, installation, seaming, CQA, or repairs, then perhaps there is **no information** within the NMCC Mining Plan of Operation giving information on this vital issue. This too seems **inadequate information** to provide the needed detailed information for the NMED to make an informed decision about the WASTEWATER PERMIT. I believe the PERMIT should not be approved.

CONCERN

Since the TSF will be greatly expanded into an area for which no geotechnical or hydrogeological study has been done and because the ground beneath the current TSF (Quintana) is known to be permeable and has been PROVEN to be leaking AMD into the ground water for the past 36 years; I believe the NMED should NOT approve this WASTEWATER DISCHARGE.

Within the Golder Associates report, **the existing problem(s) & potential problem(s) at Copper Flat mine are clearly defined in these sections:**

page 3 : '*During the (Quintana), 1981-82 operating period, high concentrations of* **total dissolved solids and sulfate** *were detected in groundwater immediately downgradient from the existing Quintana (unlined) TSF.*
Local seepage of contaminated groundwater, which has been attributed to the existence of permeable geologic units in the TSF foundation, allowed process water and tailings seepage to migrate from the (TSF) impoundment.'

page 1: *'Permeable foundation materials encountered during site investigation and construction of the (Quintana) TSF have been identified as the potential pathway for seepage from the TSF. Meteoric water leaching of tailings from the Quintana operation potentially contributes additional sulfate and dissolved solids to local groundwater. Management of existing tailings to mitigate existing and ongoing groundwater impacts is considered a parallel objective of TSF design.'*

page 2 - **2.2** *'The existing TSF site was extensively explored by Sargent, Hauskins & Beckwith (SHB) in 1979 and 1980 as part of the SHB design effort.*
No additional field work *was conducted as part of (this- Golder Assoc) conceptual design efforts.'*

'...the (TSF) facility [for NMCC] will be expanded approximately 1,000 feet to the east.'

"Geotechnical investigation (SHB, 1980) of the existing TSF area was extensive, however, a portion of the new TSF will occupy ground that has <u>not</u> (my emphasis) been evaluated for geotechnical and hydrogeological condition. A <u>preliminary site investigation plan</u> (my emphasis) is presented in this (Golder Assoc., Inc) conceptual design report."

<u>CONCERN</u>
A dam breach and flood routing analysis will be required by the State Engineer (10.25.11.12 C (1) NMAC) to verify this classification.'
Has this analysis been completed ? If it has not, then the NMED must not approve this Wastewater Discharge Permit.

page ES-2 & page 5: **3.2 Hazard Classification**:
'Based on the rules and regulations of the NM State Engineer, the Copper Flat TSF would be classified as a large dam having significant hazard potential." According to the New Mexico Administrative Code (19.25.12.10 B NMAC)'
'Dams assigned the significant hazard potential classification are those dams where failure or misoperation result in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.'

Page 5: 3.2 Hazard Classification

'The TSF lies within the Greyback Wash drainage. Inspection of aerial photographs (Google Earth) indicates no human habitations in or adjacent to Greyback Wash between the TSF facility and ***Caballo Lake, into which Greyback Wash ultimately discharges. [Caballo Lake is a reservoir of the Rio Grande River. (My addition)]***
A dam breach and flood routing analysis will be required by the State Engineer (10.25.11.12 C (1) NMAC) to verify this classification.'

COMMENT / CONCERNS
All the above information alerts NMED, other agencies & the Public to the problems at the Copper Flat mine site concerning any future tailings storage facility. It is obvious that any conceptual plans, technical plans and construction quality assurance for a new TSF need to be *scrutinized with great care*.

Wisdom would indicate that to protect the water & all aspects of the environment and for the highest quality all around there needs to be included in the NMCC Mining Plan of Operation & in the WASTEWATER DISCHARGE PERMIT application, a Construction Quality Assurance Plan and a CQC Plan for any HDPE geomembrane liners. This would include a *highly qualified business* that can independently do the necessary testing at each step in the process of any HDPE geomembrane.

Here are a few highlighted points from The EPA Guide
See the document for further details:

Quoting highlights from the Reference:
The *EPA Guide, Chapter 7, Section B,
Designing and Installing Liners:
Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles (see attached):

*EPA Guide page 2: '*If the risk evaluation recommended the use of a single liner, the next step is to determine the type of single liner system most appropriate for the site. Determining which material, or combination of materials, is important for protecting human health and the environment [1].' Following this is detail on Clay, geosynthetic clay liners & **geomembrane liners.***

*EPA Guide page 10: B. '*Geomembrane or flexible membrane liners are used to contain or prevent waste constituents and leachate from escaping a waste management unit.'*

Geomembrane or Flexible Membrane Liners

*EPA Guide page 11: What are the thickness recommdations for geomembrane liners?
'Recommended minimum thicknesses ensure that the liner material will withstand the stress of construction and the weight load of the waste, and allow adequate seaming to bind separate geomembrane panels. Reducing the potential for tearing or puncture, through proper construction and quality control, is essential for a geomembrane to perform effectively. '

'What issues should be considered in the design of a geomembrane liner? *...determining appropriate material properties and testing to ensure these properties are met, understanding how the liner will interact with the intended waste stream, accounting for all stresses imposed by the design, and ensuring adequate friction.'*

Material Properties & Selection: *' When designing a geomembrane liner, you should examine several properties of the geomembrane material in addition to thickness, including: tensile behavior, tear resistance, puncture resistance, susceptibility to environmental stress cracks, ultraviolet resistance, and carbon black content. '*
Puncture & tear resistance: *'...subject to tearing during installation due to HIGH WINDS or handling.'*

Susceptibility to *environmental stress cracks*: *'In surface impoundments ...cracks can also result where the geomembrane liner... .. has greater exposure to atmosphere and temperature changes, such exposure can increase the potential for environmental stress cracking.'*

Ultraviolet resistance: *'...especially in cases where the liner might be exposed to ultraviolet radiation for prolonged periods .....which often occur in surface impoundments... ...can cause degradation and cracking. Adding carbon black or other additives....can increase ultraviolet resistance. Backfilling over exposed geomembrane...works to prevent degradation due to ultraviolet radiation.'*

Pages 11-12: Interactions With Waste *'...**chemical resistance** is a critical consideration. Testing for chemical resistance ... American Society for Testing materials (ASTM) has also adopted standards for testing the chemical compatibility of various geosynthetics, including geomembranes, with lechates from waste management units. ASTM D-5747 provides a standard for testing the chemical compatibility of geomembranes.'*

Stresses Imposed by Liner Design: *'...include: the differential settlement in foundation soil,*
strain requirements at the anchor trench,
strain requirements over long, steep side slopes,
stresses resulting from compaction,
and seismic stresses. '

Designing for Adequate Friction: *'Adequate friction between the geomembrane liner and the soil subgrade, as well as between any geosynthetic components, is necessary to prevent extensive slippage or sloughing on the slopes of a unit.'* Several points are explored. *'An evaluation of these issues can affect the choice of geomembrane material, polymer type, fabric reinforcement, thickness, and texture necessary to achieve the design requirements. '*

What issues should be considered in the construction of a geomembrane liner?:
'....appropriate shipment and handling procedures,
perform testing prior to construction,
prepare the subgrade,
consider temperature effects,

and account for wind effects
....select a seaming process,
determine a material for and method of backfilling
AND plan for testing during construction.'

Pages 12-13: Shipment, Handling, and Site Storage *'You should follow quality assurance and quality control procedures to ensure proper handling of geomembranes. ' '...provide for proper storage (on site).'*

Subgrade Preparation: *'..subgrade material should meet specified grading, moisture content, and density requirements.' 'see Chapter 3 of EPA's* Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities (U.S. EPA, 1993c)'

Testing Prior to Construction: *'Before any construction begins, it is recommended that you test both the geomembrane materials from the manufacturer and the installation procedures. Acceptance and conformance testing is used to evaluate the performance of the manufactured geomembranes.*
Constructing test strips can help evaluate how well the intended construction process and quality control procedures will work.' Details are given with ASTM Methods sited.

Page 14: Temperature Effects: *'Liner material properties can be altered by extreme temperatures.*
High temperatures can cause geomembrane liner surfaces to stick together (blocking).
Low temperature can cause the liner to crack when unrolled or unfolded.
Recommended maximum and minimum allowable sheet temperatures for unrolling/unfolding 50°C (122°F) and 0°C (32°F).'

Wind Effects: *'Windy conditions can increase the potential for tearing.....panels can be weighted down with sand bags.'*

Seaming Processes: *'..a critical step involves field-seaming the separate panels or rolls together. For more information,* 'Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams. (U.S. EPA, 1991c).
Consistent quality in fabricating field seams is paramount to liner performance.
Conditions that could affect seaming should be monitored and controlled during installation.
Factors influencing seam construction and performance include:
ambient temperature,
relative humidity,
wind uplift,
changes in geomembrane temperature,
subsurface water content,
type of supporting surface used,
skill of the seaming crew,
quality and consistency of chemical or welding materials,
preparation of liner surfaces to be joined,
moisture at the seam interface,

and cleanliness of the seam interface.'
[No time for a coffee break !]

'To help control some of these factors,
no more than the amount of sheeting that can be used during a shift or a work day should be deployed at one time.
To prevent erosion, ambient temperature increase caused by carbon black, the subgrade should not be wet, etc. '
'Regardless of how well a geomembrane liner is designed, its ability to meet performance standards depends on proper quality assurance and quality control during installation.'

Page 15: Protection and Backfilling: *'For soil covers, three considerations determine the amount of slack to be placed in the underlying geomembrane*
.....appropriate type of soil,
using proper type of equipment,
establishing a placement procedure for the soil.
'... prevent wrinkling ....vehicles do not drive directly on the liner, ...prevent damage caused by covering the liner with too much (page 16)soil too quickly.

'Preventing premature liner failure can be faster and more cost-effective than having to repair a damaged liner.'

Page 16: Testing During Construction:
Testing during construction enables assessment of the integrity of the seams connection the geomembrane panels. ....categorized as either destructive or nondestructive.'
'For increased quality assurance, it is recommended that peel and shear tests on samples from the installed geomembrane be PERFORMED BY AN INDEPENDENT LABORATORY."
See many additional details in the document.
'If test results for the seam or sheet samples do not meet the acceptance criteria for the destructive tests, you should continue testing the area surrounding the rejected sample to determine the limits of the low quality seam....then corrective measures...and retesting.'
Nondestructive Testing is done differently – see the document for details.

Page 23 - IV Double Liners (Primary and Secondary Lined Systems) For details see the report.

Page 24 – V Leachate Collection and Leak Detection Systems For details see the report.

My comment about the above issues highlighted from the EPA Guide is that the November 2015 DEIS, which is one main document I have to work from to know what to research, is woefully incomplete and inadequate without a detailed CQA Plan included in the Wastewater Permit application, so that the EPA considerations will be covered & the CQA Plan can be evaluated by the NMED and all the other Departments involved, plus the public before the PERMIT application goes forward.

CONCERN

In a phone conversation with Brad Reid, NMED, I was told that NMCC is required by New Mexico law to follow the **Copper Rule**

TITLE 20 ENVIRONMENTAL PROTECTION - CHAPTER 6 WATER QUALITY - PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES -
20.6.7.1 ISSUING AGENCY: Water Quality Control Commission.

Mr. Reid told me that the NMCC WASTEWATER DISCHARGE Permit Application does not state within it that NMCC must follow the Copper Rule (it is just assumed).
He said that a statement to that effect does need to be added to the Permit Application.

The Copper Rule does give some guidelines about a CGA and CQC. They seem very generalized, just an outline. They do not give specifics. Doesn't it seem critical to know these details before the WASTEWATER PERMIT decision is made?

CONCERN

WASTE ROCK

If the NMED approves this NMCC Wastewater Permit application for the Copper Flat Mine Project, I am concerned about any **toxic run-off** coming from the **waste rock disposal areas** containing partially oxidized and unoxidized material &/or **low-grade ore stockpiles.**

How will our local summer storm pattern of sudden intense rainfall including:

- how quickly ditches fill and overflow during these storms
- and how powerful the rushing raging water can be
- and how often this onslaught of water breaks through ditches that are man-made.

I am concerned because of how large these disposal areas and stockpile areas will be.
In the MPO, Page 3-6, 3.2.2 Waste Rock Disposal Area and Low-Grade Stockpile, NMCC says "These disposal areas would be expanded under the current MPO to cover approximately **210 acres** (Appendix B).

After the close of the mine the MPO states that there would be approximately 37 million tons of waste rock and 19 tons of low-grade ore.

I am concerned about the quantity of rainwater during a major summer rainstorm landing on this large acreage could carry toxic fluid from the wasterock area and eventually seep into ground water.

I am concerned because an accident of this type could occur AFTER THE MINE RECLAMATION IS FINISHED AND NMCC IS NO LONGER INVOLVED OR LIABLE FOR ANY DAMAGE.

CONCERN
Data Missing from the NMCC Mining Plan of Operation

If the NMED approves this NMCC Wastewater Permit application for the proposed Copper Flat Mine Project, Sierra County, New Mexico, I am concerned about all the places in the Plan of Operation where data is missing.

I am concerned because there are places where instead of data it just says:

- "Pending"

- "will be determined....."
- "will be added as design studies go forward...."
- and other similar statements that are used in place of adequate data, studies, plans, reports, etc concerning the actual Plan of Operation

I am concerned because there is no way to know if what may be added as data, studies, plans, reports, etc concerning the actual Plan of Operation might be a CONCERN and the public has NO WAY to voice it's CONCERNS if it does not have a chance to see this information.

COMMENT- other resource documents
Predicting Water Quality Problems at Hardrock Mines, A Failure of Science, Oversight, and Good Practice by Alan Septoff, EARTHWORKS, 2006

"Summitville Mine". *Region 8 - Superfund*. U.S. Environmental Protection Agency. Archived from the original on 2006-10-10.
http://web.archive.org/web/20061010032331/http://epa.gov/region8/sf/sites/co/sville.html
Retrieved 2007-01-04.

Effects of Surface Mining on Ground Water Quality, Nature of Ground-water pollution by surface mining by Henry Rauch

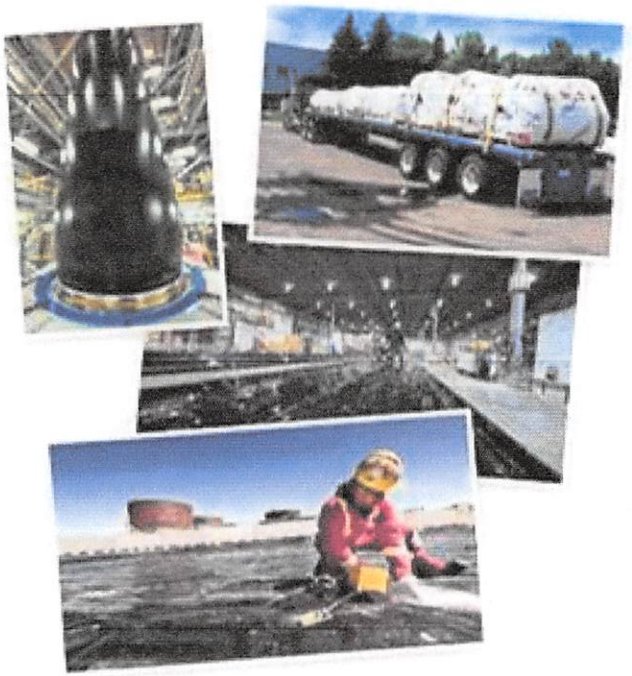
HARDROCK MINING IN NEW MEXICO, 2006
EARTHWORKS 2007, Cathy Carlson and Jonathan Schwartz
www.earthworksactio.org
Abandoned Mines: The counties with the most abandoned mines are Grant, McKinley and **Sierra**. The state does not have dedicated funding for cleaning up *pollution* from abandoned mines. The New Mexico Abandoned Mine Land Bureau gets funding from the federal Surface Mining Control and Reclamation Act to mitigate only physical hazards at abandoned hardrock mines.

Article 22, Section 21 of the Constitution of the State of New Mexico says,
"The protection of the state's beautiful and healthful environment is hereby declared to be of fundamental importance to the public interest, health, safety, and general welfare.
The legislature shall provide for control of pollution and control of despoilment of the air, water and other natural resources of this state, consistent with the use and development of these resources for the maximum benefit of the people."

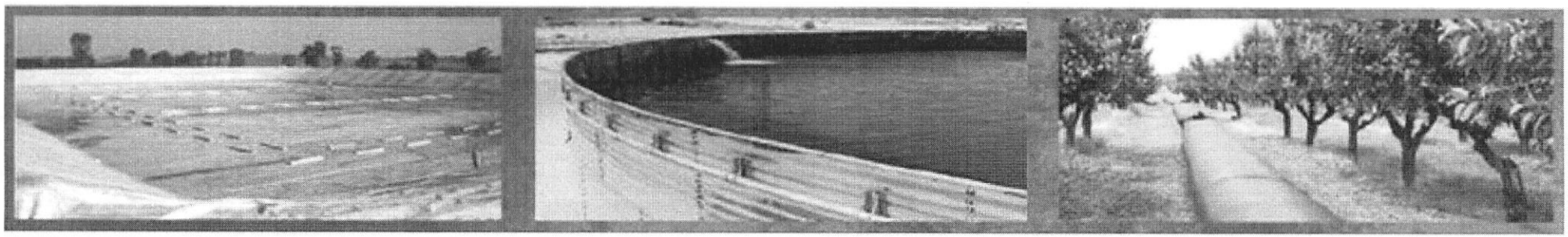
Thank you for hearing the concerns and questions of the public at this Public Healing.

VERTICAL INTEGRATION

Layfield Environmental Containment is a vertically integrated company involved in the manufacturing, fabrication, installation, and maintenance of high performance geomembranes and specialty geosynthetics. We are the only company that provides you single-source accountability through our combined abilities to manufacture, fabricate, install and service.



- Manufacturing – Our geomembrane extrusion facility is located in Vancouver, British Columbia.
- Fabrication – Our fabrication facilities are located in San Diego (California), Edmonton (Canada), and Toronto (Canada). Our state-of-the-art roll-to-roll automated fabrication machine that can weld up to 5 panels wide.
- Installation – We have installation crews across North America. Layfield installs, designs, and services many types of geosynthetics products with a focus on geomembrane and floating covers.
- Inspection and Maintenance - Layfield has a complete service department that specializes in the cleaning, inspection, and repair of geomembranes, floating covers, and other geosynthetic installations.



Layfield is committed to help Californians protect their water and their future. **At Layfield, WE PROTECT.** For more information, contact Layfield at 619.273.5003 - sandiego@layfieldgroup.com.

19234

GEOSYNTHETICS HELPING TO CONSERVE OUR ENVIRONMENT

August 30, 2010

We increasingly read or hear statements about the negative impacts of plastics on our environment. While it's true that plastic bottles littering public spaces certainly don't benefit the earth or its inhabitants, it's important to remember that there are many types of plastic and many ways in which it can be used.

What are geosynthetics?

Geosynthetics (plastics that are used in the earth) are a family of plastic-based products that are helping us conserve resources and protect the environment. These important products include geomembranes (liners) and floating covers. In most cases, geosynthetics are not only the most energy efficient and cost effective way of constructing infrastructure projects, but they simultaneously provide systems which help protect the environment.

What makes geosynthetics a good choice for the environment?

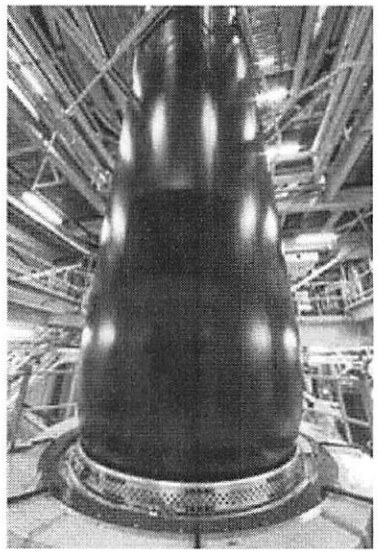
They are less resource intensive

The plastics used in geosynthetics are lightweight, durable, and easy to install requiring considerably less energy to ship and place than alternative construction materials and techniques. Geosynthetics are also resource efficient; plastics account for only 2% of all petroleum use and do not contribute significantly to greenhouse gas emissions. Plastics are also resistant to corrosion and degradation which allows us to use them for permanent applications such as landfill liners and reservoir floating covers.

They safeguard our water

Geomembranes are impervious plastic liners designed to contain a wide variety of liquids including water, waste water and various chemicals. Geomembranes are normally used for water containment and waste water treatment ponds. Each year Layfield helps safeguard precious drinking water by carefully lining and/or covering ponds and reservoirs with drinking water rated geomembranes.. Lining a reservoir with a plastic geomembrane is much less energy intensive and far more effective than lining a reservoir with clay, concrete, or asphalt. And, where other liner types can contribute contaminants to the water, plastic reservoir liners maintain the purity of the water. Our floating covers protect drinking water from evaporation and contamination. Lined ponds with floating covers are much more cost effective methods of storage than tanks or structural reservoirs and are gaining in popularity around the world.

MANUFACTURING



Layfield Environmental Containment is a leading North American manufacturer of flexible geomembrane liners. The manufacture of geomembranes at Layfield is governed and controlled by our registered quality management system which meets the requirements of the ISO 9001:2008 standard. Each product is certified to meet published Minimum Average Roll Value (MARV) specifications which can be found on this website. Layfield can provide signed mill certificates for each lot of geomembrane produced, showing actual results for specified properties.

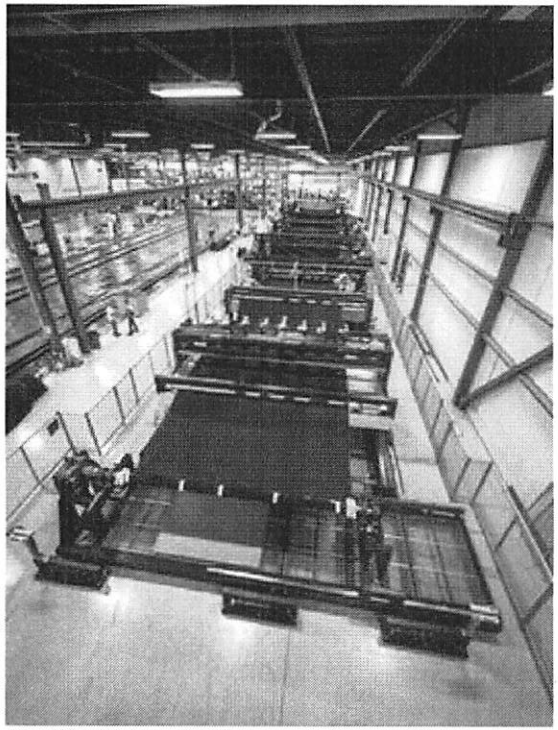
Layfield is the leading manufacturer of fortified geomembranes. The process of fortifying a geomembrane requires that a geomembrane be manufactured with special prime grade resins blended with advanced additives that provide superior physical, mechanical and endurance properties. The advantages of a fortified geomembrane include superior chemical resistance and long-term performance properties. Our Research and Technology Group constantly researches and develops innovative ways to enhance the quality of our existing products, and develop new and more specialized products.

Layfield manufactures some of the industry's most popular brands of geomembranes including our Enviro Liner® and HAZGARD® geomembranes. Layfield also manufactures a variety of standard grade polyethylene geomembranes. Layfield is able to produce a variety of wide geomembrane widths and thicknesses designed both for prefabricated liners and field installed liners. Our co-extrusion process provides texturing capabilities and a variety of specialty skin colors.

LAYFIELD UNVEILS THE GEOFAB 5X

November 25, 2014

Layfield announced today the commissioning of the *GeoFab 5X; the* world's largest combined geotextile sewing and geomembrane welding production line. With this line Layfield has significantly scaled up its plant conversion capabilities to tackle the world's largest and most demanding projects. Brian Fraser, Vice President of Layfield Environmental Containment says, "The *GeoFab 5X* is a game changer in terms of scale. It can join master rolls of geosynthetic material at high-speeds up to 26 metres (85') wide and can make any length roll our customers can handle. There's nothing like this line anywhere else in the world!" *GeoFab 5X* is designed to both sew high strength geotextiles as well as thermally weld geomembranes.



Layfield recently completed an extremely large project that required over 37,700,000 ft^2 (3,500,000 m^2) of high strength geotextile fabric with 373 miles (600 km) of sewn seams that had a rigorous specification requirement of 470 pounds per inch (82 kN/m) of tensile strength. In addition, the geotextile portion was on the critical path of the project's schedule and had a very tight construction timeline for completion. As the industry leader in providing innovative solutions with geosynthetics, Layfield commissioned the design and construction of the world's most efficient geosynthetic fabrication line, with state-of-the-art seam integrity technology.

High strength geotextiles are used to reinforce and stabilize weak soils when working in poor subgrade conditions. Applications include building access roads, lease pads, reinforced slopes, tailings dam reinforcement, and capping sludge and tailings ponds as part of their final restoration and closure phase. *The GeoFab 5X* line will also weld large prefabricated geomembrane panels (impervious liners) used to provide environmental containment. Applications for geomembranes include the lining of tailings ponds, waste water lagoons, landfills, irrigation canals, and water and waste water treatment ponds.

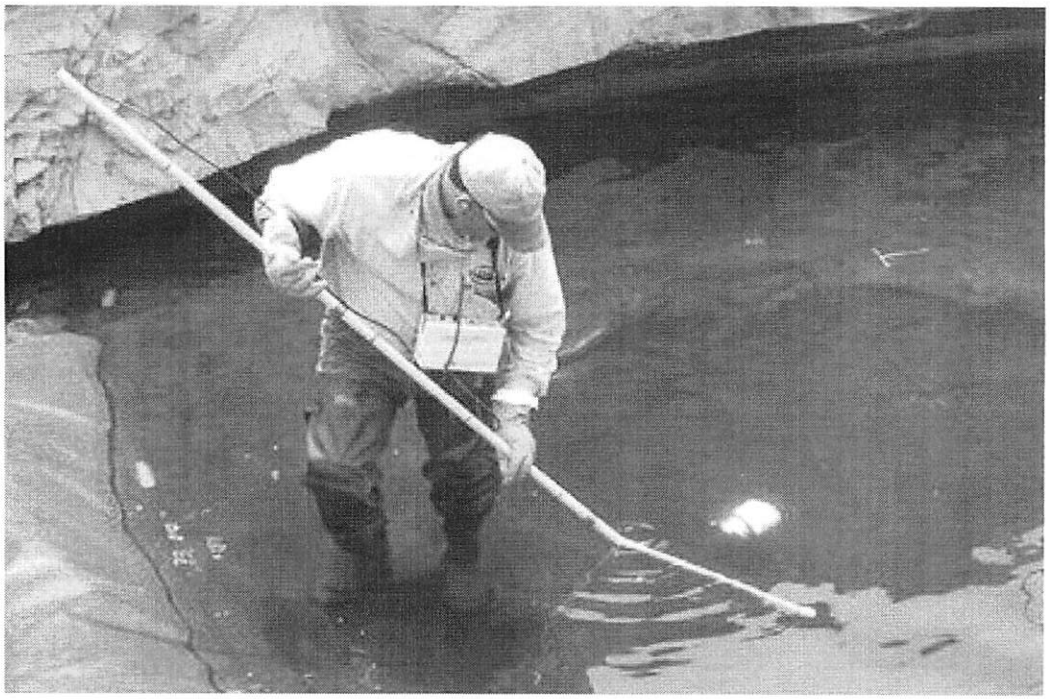
ICATION

s one of the leading geomembrane and
: fabricators in North America. Our
n facilities are located in San Diego
a), Edmonton (Canada), and Toronto
Our state-of-the-art, roll-to-roll automated
n machine can weld up to five
orane panels wide. Prefabrication, also
: factory fabrication, refers to the process of
or welding geomembranes or geotextiles
panels that are folded and transported to
ct site. Factory fabrication is done under
ditions in our fabrication plants; there is no
out extreme temperatures, moisture, or duct interfering with the production of a sound seam. Facto
n also reduces or eliminates field seaming, speeding up installation and significantly reducing cos
broadest and most complete range of prefabricated geomembranes in the market. For more infor
ation capabilities, please contact Layfield.

CONSTRUCTION SERVICES

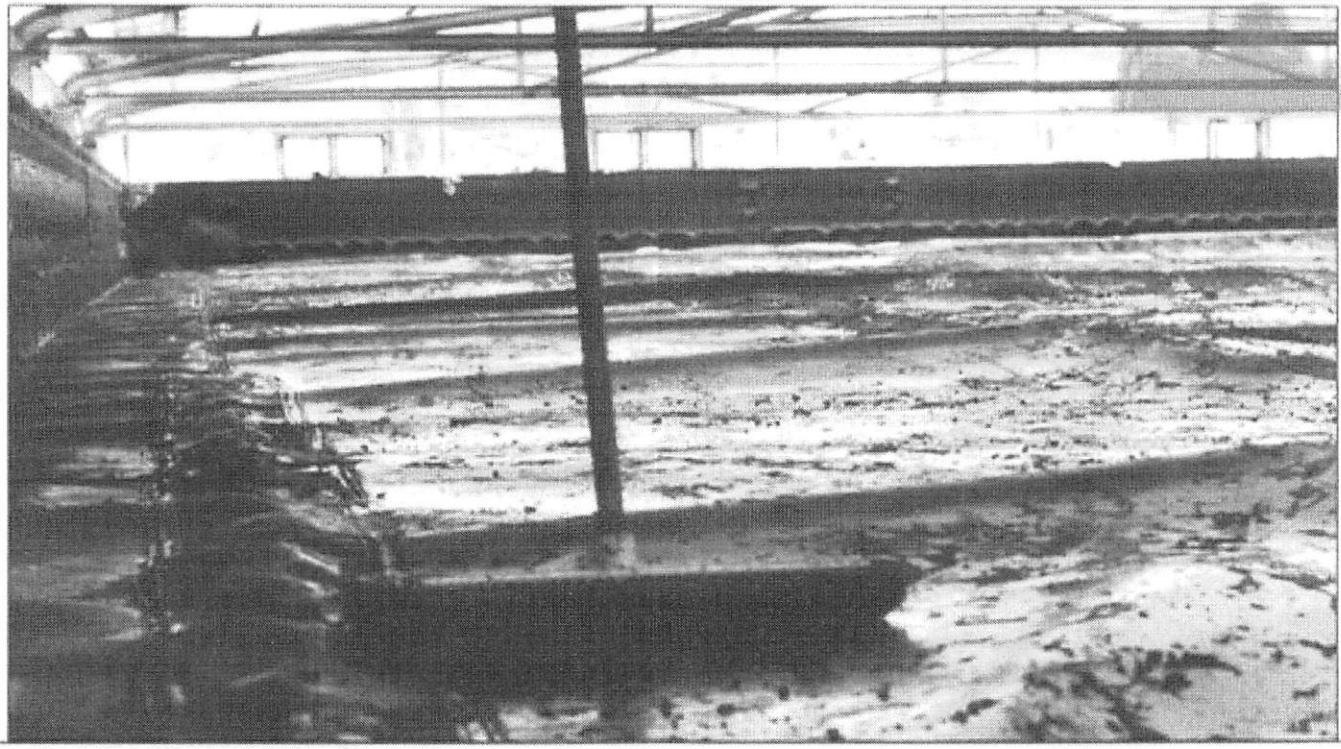
Layfield is a specialized contractor providing construction services across North America, with a focus on geomembrane and floating covers. Layfield has achieved Approved Installation Contractor status through the International Association of Geosynthetics Installers. We place, weld, and test millions of square meters of material each year. Our installation crews are trained in quality control, safety, and project management so that every new Layfield geosynthetic installation is as reliable as the last. From the smallest secondary containment system, to the largest floating covers, Layfield's installation crews are ready to tackle your critical environmental protection project.

MAINTENANCE SERVICES



Layfield has a complete service department that specializes in the cleaning, inspection, and repair of geomembranes, floating covers, and other geosynthetic installations. Layfield can provide contract maintenance services as part of your environmental monitoring plan. Geomembranes are often relied upon to provide the majority of environmental protection at a facility; however they usually receive little maintenance. Layfield's technicians can locate defects in the geomembrane and restore your environmental protection. Contact Layfield for additional information on our maintenance packages and services.

SOLVENT CONTAINMENT TANKS copper and uranium mines



Description

Three copper and uranium mines needed to replace costly stainless steel tanks with concrete tanks lined with high density polyethylene (HDPE geomembrane). The tanks were tested before filling and a number of leaks were found. The holes were repaired and the tanks were again filled; more leaks were found and repaired. They were filled with process solution - leaks were found and repaired. This process was continued until leaks were occurring faster than they could be fixed. Because leaks occurred in and along the edges of welds, the liner installer was blamed for making faulty welds. The culprit, however, was improper material selection. The organic components contained in the tanks were unsuitable for containment by HDPE. To date, the failure of the liners at one of the mines has resulted in a lawsuit for $23 M. The figure is still climbing...

Cause

Material selection. The design engineer insisted that HDPE liners had been used satisfactorily in similar installations - they had not. In fact, the organic components contained in these tanks were listed in typical chemical resistance charts as being unsuitable for containment by HDPE. During the design phase, the HDPE manufacturer recommended that simple chemical resistance tests be performed at a cost of about $10,000. The engineer did not see the need to spend $10,000 and declined to do the tests.

APPENDIX N

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE LINER SYSTEM

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE COMPOSITE LINER SYSTEM AT GREGORY CANYON LANDFILL

Prepared for:

Bryan A. Stirrat & Associates
16885 West Bernardo Drive, Suite 305
San Diego, California 92127

Prepared by:

GeoLogic Associates
16885 West Bernardo Drive, Suite 305
San Diego, California 92127

May 2003
Revision 1: November 2003
Revision 2: April 2004
9539-65

GEOTECHNICAL CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN FOR CONSTRUCTION OF THE COMPOSITE LINER SYSTEM AT GREGORY CANYON LANDFILL

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1.0 INTRODUCTION

A Construction Quality Assurance (CQA) program consists of selected testing, inspection and documentation of a final construction product in order to provide the Owner/Agencies an evaluation of whether the end product is of the specified quality of materials and workmanship. Because of possible conflicts of interest, the Contractor should not undertake the CQA function directly. Rather, CQA inspection and testing should be left under the objective authority of a single team of inspection professionals.

A Construction Quality Control (CQC) program consists of selected tests and inspections performed by the Contractor during production which can assist the Contractor in producing the quality product required. While the CQC function is the sole responsibility of the Contractor, the Project Manager may, at his/her discretion, provide information regarding the ongoing CQA monitoring for the Contractor's use in implementing his/her CQC function. Release of the CQA data to the Contractor is for convenience only and, in no way, relieves the Contractor from their responsibility to fulfill the project requirements.

The composite liner system proposed for the GCLF consists of individual discrete layers of earth and synthetic materials which will function as a unit to form the containment system for the waste management area. A geocomposite drainage layer and additional layers of GCL and geomembrane will also be installed on benches and under the LCRS mainline as shown on the Project Drawings.

Each of these components functions as an integral part of the composite liner system and consequently must become a finished product during the course of construction. As a result, it is important that each layer or component of the composite liner be completed to the design specifications prior to construction of successive or overlying layers. For this reason, it is both inefficient and impractical to withhold CQA testing until completion of the liner and it is necessary to conduct an ongoing CQA program during construction.

This document presents the geotechnical Construction Quality Assurance (CQA) Plan for installation of the earthwork and geosynthetic components of the composite liner system for the Gregory Canyon Landfill (GCLF) in San Diego County, California. This CQA Plan is to be used in conjunction with the Preliminary Engineering Design and Phased Development Plans (September 2001) and Specifications prepared for the GCLF.

This plan includes:

- A Quality Assurance Program to be implemented during earthwork and geosynthetic material construction; including field observation, laboratory and field testing, and acceptance criteria for constructed work;

- Recording and documentation procedures to be employed for demonstrating that the constructed earthwork and geosynthetic liner components meet the requirements of the Project Plans and Specifications;

- Lines of communication, responsibilities and roles of the Construction Quality Assurance team and other related Project Personnel.

1.1 PROJECT REQUIREMENTS

In order to satisfy the requirements established by the governing regulatory agencies, the following composite liner system design has been proposed for the GCLF.

In floor areas (gradient less than 5:1 horizontal:vertical), the composite liner system designs will be composed of the following elements:

- Subgrade prepared to the requirements of the Project Documents;
- A one-foot thick subdrain gravel layer composed of select drainage gravel materials;
- A twelve (12)-ounce per square yard non-woven geotextile fabric;
- A minimum two (2) foot thick compacted soil liner yielding a permeability of less than 1.0×10^{-7} cm/sec;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A nine-inch minimum thickness gravel or equivalent drainage layer;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A geosynthetic clay liner (GCL);
- An 80-mil thick double-sided textured HDPE geomembrane;
- A sixteen (16) ounce per square yard non-woven geotextile fabric;
- A one (1) foot thick leachate collection layer composed of select drainage gravel materials;
- A twelve (12) ounce per square yard non-woven geotextile fabric;
- A two (2) foot thick protective cover soil layer (operations layer) composed of select on-site soil materials. Said materials shall be screened to exclude particles in excess of one-inch in maximum dimension.

In slope areas (gradient steeper than 5:1 horizontal:vertical) the liner system will be composed of the following elements:

- Subgrade prepared to the requirements of the Project Documents;
- A minimum two (2) foot thick compacted soil liner yielding a permeability of less than 1.0×10^{-7} cm/sec;
- A 60-mil thick double-sided textured HDPE geomembrane;
- A geosynthetic clay liner (GCL);
- An 80-mil thick single-sided textured HDPE geomembrane (textured side placed down);
- A sixteen (16) ounce per square yard non-woven geotextile placed immediately on top of the geomembrane;
- A minimum two (2) foot thick protective soil cover (operations layer) composed of select on-site soil materials. Said materials shall be screened to exclude particles in excess of one-inch in maximum dimension.

All materials used to construct the composite liner system must meet or exceed the criteria established in this CQA document and the Project Plans and Specifications. Any deviation from these criteria must be pre-approved by the Engineer and the Geotechnical CQA Consultant.

2.0 RESPONSIBLE PARTIES AND DEFINITIONS

2.1 RESPONSIBLE PARTIES

The responsible parties for all composite liner system construction activities at the GCLF, as set forth herein, are as follows:

Owner:
Gregory Canyon Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111
Phone: (415) 391-2833
Contact: General Manager, Dr. Jerry Riessen

Landfill Operator:
Gregory Canyon Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111
Phone: (415) 391-2833
Contact: General Manager, Dr. Jerry Riessen

Landfill Engineer:

Bryan A. Stirrat & Associates
1360 Valley Vista Drive
Diamond Bar, California 91765
Phone: (909) 860-7777
Contact: Mr. Mike Cullinane

Construction Manager:

To Be Determined

Geotechnical CQA Consultant:

To Be Determined

2.2 DEFINITIONS

"Construction Manager" - Person(s) or firm(s) authorized by the Owner to manage and oversee the administration of the Construction Contract. The Construction Manager shall be responsible for evaluating lines and grades (survey control) for the individual liner elements as well as verification of payment request, submittal acceptance, and change orders.

"Contractor" - The firm responsible for all elements of construction of the containment system. In this regard, the Contractor's responsibilities includes but are not limited to: preparation of subgrade and supporting surfaces (generally soil) for the geosynthetic installation; installation of the HDPE and geosynthetics; and placing earth and granular materials over the installed synthetic systems. The Contractor is further responsible for all activities of Subcontractors including but not limited to the geosynthetics Subcontractor.

"Geosynthetics" - A generic classification given to synthetic (man-made plastic and fabric) materials used in geotechnical and construction applications. Included are geomembrane or flexible membrane liners (i.e., HDPEs), geotextiles, geosynthetic clay liner (GCL), geonets, geogrids, geocomposites and geocells. At the GCLF, the term geosynthetics is used to refer to the HDPE, GCL, geocomposites and geotextiles.

"Geosynthetic Subcontractor" - The firm responsible for handling, storing, placing, seaming, and other aspects of the installation of the geosynthetics included in the composite liner system.

"Geotechnical CQA Officer" - The individual or firm serving under the direction of the Geotechnical Project Director and responsible for day to day geotechnical Construction Quality Assurance (CQA).

"Geotechnical CQA Monitors" - The individuals working under the direction of the Geotechnical CQA Officer who are routinely involved in the construction process. Such personnel include "Technicians", "Field Engineers" and "Field Geologists" representing the Geotechnical Consultant. CQA Monitors responsible for the geosynthetics and earthwork, shall be experienced in landfill construction monitoring, geosynthetic material installation, low-permeability soil construction and testing, and compaction testing during grading operations.

"Geotechnical Consultant" - Geotechnical firm responsible for the design and specifications for the earthwork and geosynthetic elements of the Project Plans and Specifications. The Geotechnical Consultant or his/her representative is also responsible for observing, testing, and documenting activities related to quality assurance for all geotechnical and geosynthetic aspects of construction except for engineering and survey control. All completed geotechnical work is subject to approval by the Geotechnical Consultant.

"Geotechnical Project Director" - Geological/geotechnical professional registered in the State of California who, under the employ of the Geotechnical Consultant is responsible for earthwork observation, monitoring and testing.

"Geotechnical Construction Quality Assurance for Earthwork" - The protocols to be followed in evaluating the adequacy of the Contractor's work with regard to all elements of earthworks construction with the exception of line and grade (survey) control. Said work shall include but need not be limited to all CQA activities delineated herein and in the Specifications. Geotechnical CQA is to be provided by a party independent of the Contractor.

"Geotextile" - A permeable synthetic fabric used with soil, rock, sand, gravel or any other similar materials as an integral part of the composite liner system. It can provide protection to other systems or serve to separate different materials.

"Independent Testing Laboratory" - The firm responsible for conducting selected tests of materials and/or products used for the project, such as conformance testing. The laboratory shall be independent of the Manufacturer, Contractor, Geosynthetics Subcontractor and any party involved with the manufacture and/or installation of any product to be tested.

"Landfill Engineer" - The firm responsible for the design and preparation of the Project Plans and Specifications including the containment system that fulfills the regulatory and operational requirements of the permitting agencies and Owner,

respectively. The Landfill Engineer, also known as the Engineer, is also responsible to modify or change the design if unexpected or unanticipated site conditions are encountered during construction.

"Project Documents" - Project Documents include all Construction Drawings, Record Drawings, Construction Specifications, CQA Plans, Health and Safety Plans and Project Schedules and Contractor Submittals.

"Project Manager" - The Owner's designated representative responsible for the Project.

"Project Drawings and Specifications" - All project related Drawings and Specifications including Design Modifications and Record Drawings.

"Quality Assurance" - Actions taken by the Owner or his representative necessary to evaluate whether the earthen and geosynthetic materials and workmanship meet the requirements of the Project Plans and Specifications.

"Quality Control" - Actions taken by the Contractor, Subcontractors and/or Liner Manufacturer(s) to ensure that the earthen and geosynthetic materials and workmanship meet the requirements of the Project Plans and Specifications.

"Work" - All tools, equipment, supervision, labor, and materials or supplies necessary to complete the project as specified herein and as shown on the Project Drawings.

3.0 GEOTECHNICAL CQA ORGANIZATION

The Geotechnical CQA Team for composite liner system construction will be composed of design and field personnel with specific experience in the inspection and Geotechnical CQA monitoring of earthwork, low-permeability liner soils and geosynthetic materials specifically related to landfill liner construction. The principal categories of personnel assigned to the Geotechnical CQA Team are presented below.

3.1 GEOTECHNICAL PROJECT DIRECTOR

The Geotechnical Project Director shall be a representative of the Geotechnical CQA Consultant and shall have overall responsibility for all geotechnical CQA activities and have specific experience in managing landfill liner construction projects.

The Geotechnical Project Director will be responsible for reviewing all earthwork or geosynthetic issues which may arise during construction. The Geotechnical Project Director's approval will be required for any earth or geosynthetic material modifications or for any design modifications which may impact the performance of the earth or geosynthetic materials.

3.2 GEOTECHNICAL CQA OFFICER

The Geotechnical CQA Officer will serve as the Geotechnical Project Director's on-site representative. All Geotechnical CQA functions will be his/her direct responsibility. All coordination, reporting and issues related to earthwork and/or geosynthetics non-compliance will be directed through the CQA Officer. In addition, he/she will participate with the Landfill Engineer and Geotechnical Project Director in all decisions related to design issues which arise during the course of construction.

The Geotechnical CQA Officer shall be responsible for overall review, observation, sampling, and testing of activities utilized for Construction Quality Assurance (CQA). The Geotechnical CQA Officer shall have prior experience serving as the CQA Officer on similar liner construction projects. Specific duties of the CQA Officer include:

- Review of all designs, Project Plans, and Specifications;
- Implementation of the Geotechnical CQA program including: assignment and management of all Geotechnical CQA personnel; review of all field reports; and review of all Geotechnical CQA related issues;
- Review of design changes and coordination of such changes with the Engineer;
- Serving as the on-site representative of the Geotechnical Project Director;
- Familiarization of all Geotechnical CQA Monitors with the site and the Geotechnical CQA requirements of the project;
- Attendance at Geotechnical CQA related meetings (i.e., preconstruction, progress, and special meetings as required);
- Review of all Liner Manufacturer and Liner Subcontractor certifications and documentation and development of appropriate recommendations;
- Designation of a senior Geotechnical CQA Monitor to act on his/her behalf at the site while he/she is absent and operations are ongoing;
- Notation of any on-site activities that could result in damage to the geosynthetics;

- Review of the Liner Subcontractor's personnel qualifications for conformance with project requirements;
- Selection of locations for destructive test sampling;
- Oversight of the ongoing preparation of "As-Built" Plan(s);
- Review of all Geotechnical CQA Monitors daily reports and logs;
- Reporting to the Construction Manager and logging in his/her daily report any relevant observations reported to him by the Geotechnical CQA Monitors;
- Oversight of the marking, packaging and shipping of all laboratory test samples;
- Review of the results of laboratory testing and presentation of appropriate recommendations;
- Preparation of a monthly summary of Geotechnical CQA activities;
- Reporting of any unresolved deviations from the Geotechnical CQA Plan to the Construction Manager;
- Preparation of the final "As-Built" report for all completed geosynthetic construction activities;

3.3 GEOTECHNICAL CQA MONITORS

3.3.1 FIELD ENGINEER/FIELD GEOLOGIST

The Field Engineer/Field Geologist will be a representative of the Geotechnical CQA Consultant and will be responsible for evaluating whether earth and/or synthetic materials conform to the requirements of the Project Drawings and Specifications. The Field Engineer/Field Geologist will have specific experience in landfill construction monitoring, compaction observation and testing during grading operations, and geosynthetic material observation, monitoring and documentation. Duties of the Field Engineer/Field Geologist will include the following:

- Subgrade inspection, review, testing and documentation.
- Review of the adequacy of all clearing, grubbing, stripping and preparation of areas to receive fill.
- Monitoring and evaluation of any soil blending, mixing and processing operations.

- Evaluation of the engineering characteristics of the processed and constructed earth materials.

- Observation and evaluation of all cuts which may be impacted by geologic conditions.

3.3.2 GEOTECHNICAL CQA TECHNICIANS

Geotechnical CQA Technicians will be representatives of the Geotechnical CQA Consultant and will continuously observe all grading and geosynthetic operations to provide a basis for concluding that construction is carried out in conformance with the Project Drawings and Specifications. The duties of the Geotechnical CQA Technicians include monitoring, observing and testing all earthwork as well as monitoring, logging and documenting all geosynthetic installation operations.

The operations to be monitored observed and/or tested for the earthwork include:

- Observation of subgrade surface preparation.

- Verification that liner soils are derived from appropriate sources.

- Visual evaluation of the soil physical properties for consistency with the Project Drawings and Specifications.

- Evaluation of all moisture conditioning and processing operations to evaluate uniformity of material and moisture content.

- Evaluation of the constructed low-permeability liner material for conformance with the Project Drawings and Specifications.

- Identification of deleterious materials or other deficiencies in soil characteristics to minimize the possibility that these materials are incorporated into the composite liner system.

- Monitoring of activities for the removal and/or disaggregation of oversize material.

- Observation of uniformity of coverage of compaction equipment, especially at fill edges, turnaround areas and on slope faces.

- Monitoring of lift thickness.

- Observation of the active fill pad at the beginning of each grading day and establishment of requirements for wetting/drying and/or processing of exposed surfaces prior to placement of additional fill.

- Undertaking field tests including but not limited to BAT permeability and field moisture/density testing at the minimum frequencies noted herein or at any time that a deficiency is suspected.

- Recovery of samples for laboratory testing.

- Completion, evaluation and/or documentation of laboratory testing of the permeability, grain size distribution, Atterberg Limits, in-place moisture content and density of the low-permeability layer materials in accordance with the requirements of the Specifications (including retests, if necessary).

- Confirmation that the test results are in accordance with the Project Specifications (including retests of any previously failed areas).

The operations to be observed and monitored for all geosynthetics include:

- Material delivery.
- Unloading and on-site transport and storage.
- Placement/deployment operations.
- Joining and/or seaming operations.
- Repair operations.

Specifically, the seaming operations to be monitored include:

- The condition of panels as placed.
- Trial seams.
- Seam preparation.
- Seaming.
- Nondestructive seam testing.
- Sampling for destructive seam testing.
- Laboratory test sample marking.
- Repair operations.
- Reviewing the final certification of seams.

All observations shall be reported in a timely manner to the CQA Officer and the Construction Manager.

3.4 INDEPENDENT TESTING LABORATORY

The Independent Testing Laboratory shall be certified by the Geosynthetic Accreditation Institute (GAI) in the specific tests to be performed and will perform all conformance testing of geosynthetics and all destructive laboratory testing of field seams.

4.0 MEETINGS

In order to facilitate construction of the composite liner system, close coordination between the Construction Manager, Engineer, Geotechnical CQA Consultant, Contractor, Liner Subcontractor and Geotechnical CQA personnel is essential. To this end the following meetings will be scheduled.

4.1 PRE-CONSTRUCTION MEETINGS

A Pre-construction Meeting will be held at the site. At a minimum, the meeting shall be attended by the Owner (or designated representative), the Construction Manager, the Landfill Engineer, the Geotechnical Consultant (or designated representative), the Contractor and appropriate Geotechnical CQA staff. Specific items to be considered at this meeting will include:

- Any appropriate modifications to the Geotechnical CQA requirements.
- Development of a format for site specific documentation.
- Review of the responsibilities of each party.
- Review of the lines of authority and communication.
- Review of work area security and safety protocol.
- Review of the procedures for project documentation and reporting, and distribution of documents and reports.
- Review of procedures for submittals, change orders and extra work efforts.
- Review of the Contractor's proposed methods of construction, (including equipment), with specific emphasis on methods of select grading, soil mixing, stockpiling, processing, moisture conditioning and compaction.
- Review of the procedures for field and laboratory CQA testing.
- Establishment of procedures for correcting and documenting construction deficiencies.
- Conducting an initial site inspection to discuss work areas, stockpile areas, mixing tables, laydown areas, access roads, haul roads, and related items.
- Review of the project schedule.

The meeting shall be documented by the Construction Manager and minutes shall be distributed to all parties.

4.2 WEEKLY PROGRESS MEETINGS

Progress Meetings shall be held weekly. At a minimum, these meetings shall be attended by the Owner (or designated representative), the Construction Manager, the Geotechnical CQA Officer and/or the Geotechnical CQA Monitors, and the Contractor. Weekly progress meetings shall be documented by the Construction Manager or his/her representative and minutes shall be distributed to all parties. The purpose of these meetings is to:

- Discuss any health and safety related issues.
- Review scheduled work activities.
- Discuss project related problems.
- Review laboratory and field test data.
- Discuss the Contractor's personnel and equipment assignments.
- Review the previous week's activities and accomplishments.

4.3 SPECIAL MEETINGS

Special meetings will be conducted as required to discuss any problems or deficiencies. At a minimum, these meetings will be attended by the Owner (or designated representative), Construction Manager, appropriate Geotechnical CQA staff and the Contractor. If correction of a problem requires a design modification, the Landfill Engineer and the Geotechnical Project Director will also be present. The purpose of these meetings is to:

- Define and discuss any problems or deficiencies in the Project.
- Review possible corrective actions or solutions.
- Implement an action plan to resolve the problems or deficiencies.

Special meetings shall be documented by the Construction Manager or his/her representative and minutes shall be distributed to all parties.

4.4 GEOSYNTHETIC MATERIAL PRE-INSTALLATION MEETING

A Geosynthetic Material Pre-installation Meeting shall be held at the site before installation of the geosynthetics. At a minimum, the meeting shall be attended by the Construction Manager, the Engineer, the Contractor, the Liner Subcontractor, and Geotechnical CQA staff. The Pre-Installation Meeting will not be conducted until all Manufacturer Certifications required by the Project Specifications and this document are received, reviewed and approved.

Specific items to be addressed at this meeting include:

- Submittal and review of relevant documents.
- Definition of appropriate modifications to the Geosynthetic Geotechnical CQA requirements.
- Development of a format for site specific documentation.
- Definition of the responsibilities of each party.
- Definition of lines of authority and communication.
- Review of work area security and safety protocol.
- Definition of methods for documenting and reporting, including distributions.
- Selection of welding equipment and procedures.
- A field welded seam(s) demonstration.
- Identification of testing equipment and procedures, including peel and shear tests, and procedures for communicating laboratory test results.
- Identification of procedures for correcting and documenting construction deficiencies.
- A site inspection to discuss storage areas, work areas, storage areas and protocols, laydown areas, access roads, haul roads, and related items.
- Review of the project schedule.

The meeting shall be documented by the Construction Manager and minutes shall be distributed to all parties.

4.5 DAILY PROGRESS MEETINGS (if necessary)

Daily Progress Meeting shall be held in the field before the start of work each day. At a minimum, this meeting shall be attended by the Geotechnical CQA Officer or his/her representative, Geotechnical CQA Monitors, the Contractor and the Liner Subcontractor. The purpose of this meeting is to:

- Review and coordinate scheduled work activities between the Geotechnical CQA monitors and the Liner Subcontractor's crew.
- Discuss any problems.
- Review test data.

- Discuss the Liner Subcontractor's personnel and equipment assignments for the day.

- Review the previous day's activities, accomplishments and/or deficiencies.

4.6 MANUFACTURING PLANT VISIT(S)

The Liner Subcontractor shall make arrangements with the Liner Manufacturer(s) to allow the Geotechnical CQA Officer or his/her designee to visit the geosynthetics manufacturing plant(s) during manufacture of the liner material for this project and to observe manufacturing methods and quality control of manufactured materials. If appropriate, the Geotechnical CQA Officer or his/her designee shall review the manufacturing process, quality control, laboratory facilities and testing procedures.

During the plant visit, those visiting shall:

- Observe that the geosynthetic properties presented in the Liner Manufacturer's certification documents meet the Project Specifications.

- Verify that the measurements of properties by the Liner Manufacturer are properly documented and test methods used are acceptable.

- Spot inspect some of the geomembrane rolls and verify that they are free of holes, blisters, or any sign of contamination by foreign matter.

- Review packaging and transportation procedures to verify that these procedures are not damaging the geosynthetics.

- Observe that roll packages have a label indicating the name of the Liner Manufacturer, type of geosynthetic, its roll/panel number and other required information.

- Verify that extrusion rods and/or beads are derived from the same base resin type as the geomembrane.

5.0 GEOTECHNICAL CQA MONITORING FOR EARTH MATERIALS

5.1 GENERAL

Construction of the earth materials portion of the composite liner system shall be performed in accordance with the Project Drawings and Specifications and shall be continuously observed, and routinely sampled and tested by the Geotechnical CQA Monitors for the physical parameters described in this section.

The testing frequency presented herein is a minimum. Additional tests will be conducted by the Geotechnical CQA Monitor for retests and at any time that in the opinion of the Geotechnical CQA Monitor, additional testing is required and/or a deficiency is suspected. Retests of previously failed areas will be performed at the discretion of the Geotechnical CQA Monitor when, in his/her opinion, sufficient reworking of the area has been performed to warrant a retest.

5.2 LOW-PERMEABILITY MATERIALS

The low-permeability layer of the composite liner system will be constructed with on-site or import soils derived from a source approved by the Geotechnical Consultant. Low-permeability liner materials will be evaluated by the Geotechnical Consultant according to the following minimum testing schedule in order to characterize material properties:

Low-Permeability Import Material Testing Type and Frequency

Test Description	Test Designation	Minimum Test Frequency
Particle Size Analysis	ASTM D422	One per 2000 yds^3 stockpiled or one per production day (minimum)
Atterberg Limits	ASTM D4318	One per 2000 yds^3 stockpiled or one per production day (minimum)
Classification of Soils for Engineering Purposes	ASTM D2487	One per 2000 yds^3 stockpiled or one per production day (minimum)
Processed Moisture Content (following moisture conditioning)	ASTM D4643 (microwave) or ASTM D2216 (oven)	Two per construction day
Laboratory Permeability	ASTM D5084/EPA 9100 or USBR Modified E-13	One per 10,000 c.y
Moisture/Density Relationship	ASTM D1557	One per 10,000 c.y.
Visual Inspection	ASTM D2488	Daily while stockpiling

No soils other than those obtained from the approved borrow source and/or approved by the Geotechnical Consultant are to be used in liner construction.

5.3 DEMONSTRATION FILL (TEST FILL PAD)

A Demonstration Fill (Test Fill Pad) will be constructed prior to actual liner construction to evaluate both the low-permeability soil proposed for liner construction and the Contractor's equipment and methods for constructing and maintaining the integrity of the low-permeability liner soils. The Demonstration Fill will be constructed by the Contractor selected to complete liner construction and as specified in the Project Specifications. Construction of the Demonstration Fill shall be completed a minimum of two weeks prior to the actual low-permeability liner construction. The Contractor shall construct the Demonstration Fill using the same earthwork equipment and Specifications to be used for liner construction to determine if the specified density/moisture content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness.

Soil sampling will be performed by the Geotechnical CQA Monitor(s) during and after construction of the Demonstration Fill to provide data regarding soil properties obtainable using the proposed design and construction methods. All criteria for Demonstration Fill construction, including low-permeability material processing, amount of compaction, moisture content, etc., will be the same as those required and anticipated for actual liner construction.

The purpose of the Demonstration Fill is to: 1) evaluate the performance of the construction equipment to be used for soil blending, processing, placement and maintaining the low-permeability soils under actual construction conditions; 2) evaluate the field performance of the low-permeability soil material through laboratory and field tests; 3) compare field (BAT) and laboratory permeability test results; and 4) develop a database of test results and performance standards prior to full-scale liner construction in order to substantiate the Construction Specifications. If necessary, the results from the Demonstration Fill construction and testing program will be used to modify the Project Specifications for low-permeability liner construction.

The Demonstration Fill will measure roughly 150 feet by 50 feet and will consist of an approximately 24-inch thick section of blended, processed, cured and compacted low-permeability soils, placed on slope and floor areas. The Demonstration Fill shall be constructed using the methods, materials and equipment to be employed during construction of the actual low-permeability layer. Processed low-permeability materials will be placed in six to eight inch lifts. Construction will be continuously observed and tested by the Geotechnical CQA Monitor and/or his/her representative.

The testing frequency used in construction and monitoring of the Demonstration Fill will be more stringent than that to be maintained during construction of the actual liner. Minimum testing requirements for Demonstration Fill construction will include:

1. Full-Time observation.
2. Density tests (ASTM D1556, D2937, or D2922) taken at a rate of at least one (1) test per 100 cubic yards of fill placed or one (1) per 6 inches of fill thickness. At a minimum, ten (10) in-place moisture/density tests will be completed.
3. At least two (2) maximum density tests (ASTM D1557) will be completed.
4. Five (5) in-situ BAT permeability tests will be conducted.
5. Five (5) laboratory permeability tests on relatively undisturbed samples (Modified USBR E-13 or ASTM D5084) will be conducted including at least one triaxial cell permeability test (ASTM D5084).
6. Five (5) Atterberg Limit tests (ASTM D4318) and five (5) grain size analyses (ASTM D422) will be completed.

5.4 LOW-PERMEABILITY FILL PLACEMENT

Select low-permeability liner soils shall be screened (if necessary), dried, and/or moisture conditioned until uniformly blended material characteristics and moisture condition are attained. Moisture conditioning, if required will allow for a minimum 48-hour curing period. Field and laboratory testing for moisture content, in-place dry density, and other engineering properties including saturated hydraulic conductivity during construction of the low-permeability layer of the liner system will be completed according to the following minimum schedule:

Low-Permeability Fill Testing Type and Frequency

Test Description	Test Designation	Minimum Test Frequency
Processed Moisture Content (following moisture conditioning)	ASTM D4643 (microwave) or ASTM D2216 (oven)	Two per construction day
Moisture-Density Relationship	ASTM D1557	One per 5,000 cubic yards or per change in material type
In-Place Moisture-Density (Nuclear and/or Drive Ring)	ASTM D2922 ASTM D3017 ASTM D2937	One per 250 cubic yards placed
In-Place Density and Moisture Content (Sand-Cone)	ASTM D1556	One per 1,000 cubic yards placed or 20 percent of total In-Place tests (whichever is greater)
Particle Size Analysis	ASTM D422	One per 5,000 yd^3 (conducted on samples retrieved for laboratory permeability testing)
Atterberg Limits	ASTM D4318	One per 5,000 yd^3 (conducted on samples retrieved for laboratory permeability testing)
Laboratory Permeability	ASTM D5084/EPA 9100 or USBR Modified E-13	One per 5,000 cubic yards placed
BAT Permeability		One per 2,500 cubic yards placed
Visual Inspection	ASTM D2488	Daily

5.5 ACCEPTANCE CRITERIA

5.5.1 GENERAL

Where test results indicate that the lift thickness, maximum particle size, homogeneity of material, cure time, moisture content, density, or permeability of any portion of the work is below the project requirements, that particular portion shall be retested and/or reworked or replaced until the required condition has been attained and the resulting product meets or exceeds the requirements of the Project Specifications. No additional fill shall be placed over an area until the existing fill has been tested horizontally and vertically and determined by the Geotechnical CQA Monitor to meet the Project Earthwork Specifications. The area to be reworked will be verified by survey if in the opinion of the Geotechnical CQA Monitor conditions warrant.

5.5.2 MOISTURE CONTENT AND DENSITY

If in the opinion of the Geotechnical CQA Officer or the Senior Geotechnical CQA Technician, low-permeability materials which have been placed and/or are

ready to be placed, do not visually have a uniform and homogeneous moisture content throughout the material in question, these materials will be removed, without testing, and will be reprocessed and/or reworked until, in the opinion of the Geotechnical CQA Officer or his/her designated representative, they are uniform in appearance.

For all fill materials placed, if test results indicate a relative dry density of less than that required or a moisture content outside the limits specified, then the area will be considered inadequate and will be reworked. Any reworked areas will be retested by the Geotechnical CQA Monitor to verify the reworked area meets the density and moisture content requirements.

The following table lists the minimum moisture/density requirements for fill materials placed. The in-place moisture content and dry density requirements are relative to the maximum dry density and optimum moisture content as determined by ASTM D1557.

Fill Type	Minimum Density (percent)	Moisture Content
Low-Permeability Layer Material	90	2 – 4% above optimum
Unclassified Fill	90	Optimum to 2% above
Protective Cover Soil	85	Optimum ± 2%

5.5.3 PERMEABILITY

If a BAT or laboratory permeability test results in a value exceeding the defined maximum of 1.0 E-07 cm/sec, two (2) additional tests of the same type will be taken in the immediate vicinity. [At the discretion of the Geotechnical CQA Consultant, BAT permeability tests may be taken in lieu of failed laboratory tests to expedite the CQA testing procedure.] If either of the additional tests fails to meet the minimum requirements, the area represented by the test will be considered inadequate and will be removed or reprocessed and recompacted.

5.5.4 LIFT THICKNESS AND PROCESSING

If at any time the CQA Monitor observes an uncompacted lift thickness in excess of eight inches or observes material being placed without meeting the requirements for processing, stockpiling and curing, the Contractor shall immediately discontinue placing additional fills in that area. For an over thick lift, the Contractor shall immediately blade the surface to reduce the lift thickness to the Project Specifications prior to compaction. If inadequately mixed materials are placed, the Contractor shall immediately remove these materials and return them to the stockpile/processing area where they will be reprocessed.

5.5.5 GEOMEMBRANE SUBGRADE

The CQA Monitor and the geomembrane installation Contractor will observe and approve the geomembrane subgrade prior to geosynthetic material deployment. The finish surface shall be free of abrupt breaks, sharp objects, or other foreign material which may damage the overlying geomembrane. The subgrade shall be unyielding, smooth and uniform and the surface shall not be pebbly or tracked and rutted by equipment.
Immediately prior to geomembrane deployment, all subgrade surfaces (i.e., floor and slopes), will be proof-rolled with a steel drum roller weighting not less than 200 pounds per lineal inch of drum width.

Geomembrane deployment shall not proceed until the surface has been approved by the CQA Monitor and accepted by the geomembrane installation Contractor.

6.0 GEOTECHNICAL CQA MONITORING FOR GEOSYNTHETICS

6.1 GEOMEMBRANE (HDPE)

Delivery of geomembrane to the site will not be allowed until all required documentation and/or certifications are approved by the CM/Geotechnical CQA Team. It is the responsibility of the Contractor/Subcontractor to ensure that all required documentation and/or certifications are approved prior to shipment.

6.1.1 HDPE MANUFACTURING

Prior to the delivery of any geosynthetic material, the Liner Manufacturer shall provide the Construction Manager with the following:

- A properties sheet for the rolls to be delivered including all specified properties measured using test methods indicated in the specifications.
- The sampling procedure and results of testing.
- A certification for each roll stating that property values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet the project specifications.
- The measurements of properties by the Liner Manufacturer are properly documented and that the test methods used are acceptable.

Prior to shipment, the Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geomembrane. The quality control certificate(s) shall be signed by a responsible person employed by the Liner Manufacturer and shall include:

- Lot and roll numbers and identification.
- Sampling procedures and results of quality control tests. At a minimum, results shall be given for those properties identified in the Project Specifications.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls related to it.
- Review the quality control certificates and verify that the certified roll properties meet the specifications.

6.1.2 GEOMEMBRANE DELIVERY

Prior to delivery, all individual roll manufacturer certifications required by this document and/or the Project Specifications must be received and approved by the Construction Manager. Delivery of any unapproved roll will not be allowed and unapproved rolls will be transported off-site at the Contractors expense.

6.1.2.1 Transportation and Handling

All transportation and on-site handling of the geomembrane is the responsibility of the Contractor and Liner Subcontractor.

The Geotechnical CQA Officer shall observe the handling equipment used on the site and provide comment on whether it might pose a risk of damage to the geomembrane. The Geotechnical CQA Officer will also observe the Contractor and Liner Subcontractor personnel's handling of the geomembrane and provide comment on whether appropriate care is being taken. Finally, the Geotechnical CQA monitor shall verify that all documentation required upon delivery has been received.

Upon delivery at the site, the Contractor, Liner Subcontractor and the Geotechnical CQA Monitor shall complete a surface observation of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Officer shall report the following to the Construction Manager:

- Rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws.

- Rolls which visually include minor repairable flaws.

Any damaged rolls shall be rejected and removed from the site or be stored at a location separate from accepted rolls as designated by the Construction Manager. All rolls which do not have proper Liner Manufacturer's documentation shall be removed from the site at the Contractors expense until all required documentation has been received and approved.

A log of all HDPE received shall be maintained by the Geotechnical CQA Monitors and recorded on an appropriate form (Form B-1 attached).

6.1.2.2 Geomembrane Storage

The Contractor and Liner Subcontractor shall be responsible for storage of the HDPE on-site and shall ensure the storage is consistent with the Manufacturer's recommendations. The Contractor shall coordinate with the Construction Manager to ensure that storage space is provided in a location (or several locations) such that on-site transportation and handling are minimized. Storage space shall be protected by the Contractor and Liner Subcontractor from theft, vandalism, and damage from actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the materials are not stored directly on the ground and storage of the HDPE is completed in a fashion that protects against damage.

6.1.3 HDPE CONFORMANCE TESTING

6.1.3.1 Tests

Upon delivery of the HDPE, the Contractor or Liner Subcontractor shall ensure that conformance samples are obtained and forwarded to the Independent Testing Laboratory at the frequency required for testing to ensure conformance with the Project Specifications. All conformance samples will be obtained in the presence of the Geotechnical CQA Monitor or his/her designated representative.

At a minimum, conformance tests will include determination of the following characteristics for the HDPE:

- Density (ASTM D1505A).

- Environmental Stress Crack (ASTM D5397).

- Tear Resistance (ASTM D1004 Die C).

- Carbon black content (ASTM D1603).
- Thickness (ASTM D5199).
- Tensile characteristics (yield strength, elongation at yield, break strength, elongation at break) (ASTM D638).
- Interface shear strength testing as described in the Project Specifications. Direct shear testing for interface strength shall be carried out in accordance with ASTM D-5321 "Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method." Issues and procedures related to soil preparation shall be governed by ASTM D3080.
- Puncture resistance (ASTM D4833).

Where optional procedures are noted in the test method, the requirements of the Project Specifications shall prevail.

6.1.3.2 Sampling and Testing Frequency

Unless otherwise specified, conformance samples shall be taken and tested at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of tests. Testing for interface shear will be conducted at a rate of one per 200,000 square feet.

6.1.3.3 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be 3 ft. long by the roll width. The Geotechnical CQA Monitors shall mark the machine direction on the samples with an arrow, and the Liner Manufacturer's roll identification number.

6.1.3.4 Test Results

The results of Conformance Testing will be documented on the appropriate forms and the Geotechnical CQA Officer shall examine all conformance testing results and report any non-conformance to the Construction Manager, the Contractor and the Lining Subcontractor.

All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and

the HDPE material can be accepted. If the second test fails, the Liner Subcontractor shall remove all material represented by the sample from the work area.

All conformance test results must be approved by the Construction Manager prior to the HDPE represented by the test being approved for deployment/installation. The decision of the Construction Manager shall be final.

6.1.4 HDPE INSTALLATION

6.1.4.1 Earthwork

Surface Preparation

The Contractor shall be responsible for preparing the supporting soil according to the Project Specifications.

Prior to liner installation, the Contractor and Liner Subcontractor shall verify and the Construction Manager and Geotechnical CQA Monitor shall observe that:

- All lines and grades have been checked by survey and approved by the Construction Manager.
- The subgrade has been prepared in accordance with the Project Specifications.
- The surface has been rolled and compacted to be free of surface irregularities, loose soil, and protrusions.
- The supporting soil surfaces do not contain stones or other sharp protrusions which could damage the HDPE.
- There are no excessively soft areas which could result in HDPE damage.
- All construction stakes, hubs or other items used for grade control and/or verification have been removed.
- The Liner Subcontractor has certified in writing that the surface on which the HDPE will be installed is acceptable using an appropriate form (Form B-3 attached).

The certificate of acceptance shall be given by the Liner Subcontractor to the Contractor and the Construction Manager prior to commencement of HDPE installation in the area under consideration. The Geotechnical CQA Monitors shall have a copy of this certificate before installation of HDPE commences in any given area.

After the supporting surface has been accepted by the Contractor and Liner Subcontractor, it shall be the Contractor and Liner Subcontractor's responsibility to indicate to the Construction Manager any change in the supporting soil condition that may require repair work. If the Construction Manager concurs with the Contractor and Liner Subcontractor, then the Construction Manager shall coordinate the repair of the supporting surface. The subject area will also be observed by the Geotechnical CQA Monitors who shall have the authority to reject an area even after it has been accepted by the Contractor and Liner Subcontractor.

Anchor Trench

Anchor trenches shall be excavated to the lines and widths shown on the Project Drawings, prior to HDPE placement. The Geotechnical CQA Monitors shall observe that the anchor trenches have been constructed according to the project documents.

Slightly rounded corners shall be provided where the HDPE adjoins the trench so as to avoid sharp bends in the HDPE. No loose soil shall be allowed to underlie the HDPE in the anchor trench.

Anchor trench backfill shall be compacted to at least 90 percent relative compaction (ASTM D1557) as outlined in the Specifications.

Care shall be taken when backfilling the trenches to prevent any damage to the geosynthetics. The Geotechnical CQA Monitors shall observe the backfilling operation and advise the Construction Manager of any problems.

6.1.4.2 HDPE Placement

Field Panel Identification

A field panel (sheet) is a discrete and integral area of HDPE which is to be seamed in the field along the edges to other field panels (i.e., a field panel is a roll or a single portion of a single roll). The Contractor or Liner Subcontractor shall assign each panel over 25 sq. feet an identification code which shall be agreed to and used by the Geotechnical CQA Monitors, Construction Manager, Contractor and the Liner Subcontractor. The Contractor or Liner Subcontractor shall locate the code with identifying roll number near the middle of panels less than 50 feet in length and at both ends of any panel over 50 feet in length. The Geotechnical CQA Monitors shall establish a chart showing correspondence between roll numbers, certification reports, and the panel identification code. The field panel identification code shall be used for all Geotechnical CQA records. An HDPE panel placement log will be maintained by the Geotechnical CQA Monitors on appropriate forms (Forms B-4 and B-5 attached).

Field Panel Placement

The Geotechnical CQA Monitors shall record the identification code, location and date of installation of each field panel.

During panel placement, the Geotechnical CQA Monitors shall:

- Verify that field panels are installed in general accordance with the panel layout plan, as approved or modified by the Construction Manager/Engineer.
- Observe the panel surface as it is deployed and record all panel defects and disposition of the defects. All repairs are to be made in accordance with the Specifications.
- Observe that the equipment used does not damage the HDPE by handling, trafficking, leakage of hydrocarbons, or by other means.
- Observe that the surface beneath the HDPE has not deteriorated since previous acceptance.
- Observe that there are no stones, construction debris, or other items beneath the HDPE which could cause damage.
- Observe that the HDPE is not dragged across an unprepared surface. If the HDPE is dragged across an unprepared surface, it shall be inspected for scratches and repaired or rejected, if necessary.
- Observe that the method used to unroll the panels does not cause scratches or crimps in the HDPE and does not damage the supporting soil surface.
- Record weather conditions including temperature, wind, and humidity. The HDPE shall not be deployed in the presence of excess moisture (fog, dew, mist, etc.), high winds and extreme temperatures as determined by the Geotechnical CQA Officer.
- Observe that people working during the installation of HDPE do not smoke, wear shoes which could damage the HDPE, or engage in activities which could damage the HDPE.
- Observe that the method used to deploy the HDPE panels minimizes wrinkles and that the panels are anchored to prevent movement by the wind.
- Observe that direct contact with the HDPE is minimized; (i.e., the HDPE is protected by geotextiles, extra HDPE, or other suitable materials, in areas where excessive traffic may be expected).

The Geotechnical CQA Monitors shall inform the Contractor, the Liner Subcontractor and the Construction Manager if the above conditions are not met.

After placement and prior to seaming, the Geotechnical CQA Monitors shall inspect each panel for damage. The Geotechnical CQA Monitors shall advise the Construction Manager which panels, or portions of panels, should be rejected, repaired, or accepted. Damaged panels or portions of damaged panels which have been rejected shall be marked and their removal from the work area recorded by the Geotechnical CQA Monitors.

6.1.4.3 Field Seaming

The Contractor shall provide the Construction Manager and Geotechnical CQA Officer with a seam and panel layout plan and shall update this plan daily as the job proceeds. No panels shall be seamed until the panel layout plan has been approved by the Construction Manager. A seam numbering system shall be agreed to by the Geotechnical CQA Monitors, Construction Manager, Contractor and Liner Subcontractor prior to the start of seaming operations.

Prior to seaming, each seaming apparatus (welder) shall be tested in accordance with the Specifications to determine if the equipment is functioning properly. The Geotechnical CQA Monitors shall observe all trial weld operations and record the results. It is important that the trial welds be completed under conditions similar to those under which the panels will be seamed. If at any time the Geotechnical CQA Monitor believes that an operator or seaming apparatus is not functioning properly, a test shall be performed on a trial weld. If there are large changes in temperature, humidity, or wind speed, the trial weld test shall be repeated. Laboratory tests may be carried out at the discretion of the Geotechnical CQA Monitors to verify field test results.

During seaming operations the Geotechnical CQA Monitors shall observe that:

- The Liner Subcontractor has the number of welders and spare parts agreed to in the pre-construction meeting.
- Equipment used for seaming will not damage the HDPE.
- The extruder is purged prior to beginning a seam until all the heat-degraded extrudate is removed (extrusion welding only).
- Seam grinding has been completed less than 1 hour before seam welding (extrusion welding only).
- The ambient temperature measured 6 inches above the HDPE surface is between 40 and 105 degrees Fahrenheit and relative humidity is less than 80 percent.

- The end of welds more than 5 minutes old, are ground to expose new material before restarting a weld (extrusion welding only).
- The weld is free of dust and other debris.
- For cross seams, the seam is ground to a smooth incline prior to welding.
- The seams are overlapped in a downgradient direction with a minimum overlap of 4 inches.
- No solvents or adhesives are present in the seam area.
- The procedure used to temporarily hold the panels together does not damage the panels and does not preclude Geotechnical CQA testing.
- The panels are being seamed in accordance with the Project Plans and Specifications using approved equipment with gauges giving applicable temperatures.
- There is no free moisture in the weld area.
- The electric generator is placed on a smooth base such that no damage occurs to the HDPE.
- A smooth insulating plate or fabric is placed beneath the hot welding apparatus after use.
- The geomembrane is protected from damage in heavily trafficked areas.

The Geotechnical CQA Monitors shall log all appropriate temperatures and conditions, and shall log and report to the Geotechnical CQA Officer any non-compliance.

Trial Seams

Trial seam samples are not removed from installed seams, but are made along side the seaming work area by the Liner Subcontractor using a fragment of the same HDPE sheet and the same installation procedures as for the HDPE installation itself. As such, they are considered nondestructive samples. Such trial seams shall be made at the beginning of each seaming period (start of day, mid-day, and anytime the equipment is shut down or the seaming operation is suspended for more than 1/2 hour) for each piece of seaming equipment used that day. In addition, each welder shall make at least one trial seam each day. Trial seams shall be made under the same conditions as those anticipated for actual seams.

The trial seam sample shall be at least 3 ft. long by 1 ft. plus the seam width wide (after seaming) with the seam centered lengthwise. Seam overlap shall be as per the Specifications.

Two opposite specimens, each 1 inch wide, shall be cut from the trial seam sample by the Contractor and/or Liner Subcontractor. Under the observation of a Geotechnical CQA Monitor, the specimens shall be tested by the Liner Subcontractor in shear and peel using a field tensiometer to verify that seams satisfy peel and tensile strength requirements. If a specimen fails, the seaming equipment and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full trial welds are achieved. After completing a successful trial/nondestructive sample, the Contractor and/or Liner Subcontractor shall cut a 2' x 2' remnant from the sample and mark the welder number, date, time, ambient temperature, welder temperature, and speed and submit it to the Geotechnical CQA Monitor who will assign an identification number and enter the information on the non-destructive sample form.

The results of field tests carried out on trial seams shall be documented by the Geotechnical CQA Monitors on appropriate form (Form B-6 attached).

General Seaming Procedure

Unless otherwise specified, the general seaming procedure to be used by the Contractor and/or Liner Subcontractor shall be as follows:

- All HDPE seams shall be overlapped a minimum of four (4) inches.
- "Fishmouths" or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut "fishmouths" or wrinkles shall be seamed and any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same HDPE extending a minimum of 6 inches beyond the cut in all directions. All corners of the patch shall be rounded with a 1-inch minimum radius.
- Adjacent to anchor trenches, seaming shall extend up the panels a minimum of 12 inches past the crest of the anchor trench.
- All cross seams shall be offset at least two feet from the cross seam of the adjacent panel and be extrusion or wedge welded where they intersect.

The Geotechnical CQA Monitors shall observe that the above seaming procedures are followed, and shall inform the Construction Manager if they are not.

6.1.5 CONSTRUCTION TESTING

6.1.5.1 Nondestructive Seam Testing

The Contractor and/or Liner Subcontractor shall non-destructively test all field seams over their full length using a vacuum test unit, spark detector, or an air pressure test (for double wedge fusion seams only), as described below. The purpose of nondestructive tests is to check the continuity of seams. It does not provide any information on seam strength. Continuity testing shall be carried out as the seaming work progresses, not at the completion of field seaming.

Visual Inspection

All seams shall be visually evaluated by the Contractor and/or Liner Subcontractor as the installation progresses and again at completion of the installation. Defective and questionable sections shall be clearly marked and repaired as necessary.

Vacuum Box Testing

If the fillet weld, extrusion lap weld or single hot-wedge fusion lap weld technique is used to weld seams, the Contractor and/or Liner Subcontractor shall further test all seams and repairs in the HDPE by vacuum box. The vacuum box shall be an American Vacuum Seam Tester, Series A100 as manufactured by American Parts and Service Company, Alhambra, California, or an approved equal. All vacuum box testing shall be done in the presence of the Geotechnical CQA Monitor. The area to be tested shall be cleaned of all dust, debris, dirt and other foreign matter. A soap solution shall be applied to the test area with a brush, paint roller or spray bottle and a minimum vacuum of 10 inches of mercury (Hg) (5 psi) shall be induced and held as long as necessary to visually inspect and mark for repair any suspicious areas as evidenced by bubbles in the soap solution.

Spark Testing

If the fillet weld is used to weld seams, the Contractor and/or Liner Subcontractor may, in lieu of vacuum box testing, test all seams and repairs in the HDPE liner by using a high voltage spark detector, similar to Tinker and Rasor Holiday Detector (Model AP-W). The setting of the detector shall be 20,000 volts. In order to conduct this test, all seams to be tested shall be provided with 24-30 gauge copper wires properly embedded in the seams and grounded. All spark testing shall be done in the presence of the Geotechnical CQA Monitor. All defective areas shall be marked for repair.

Air Pressure Test

If the double hot-wedge welding technique is used, the Contractor and/or Liner Subcontractor shall further test all seams in the HDPE lining by using the air pressure test which consists of inserting a needle with gauge in the air space between welds. Air shall be pumped to 40 psi within the weld void and held for at least 5 minutes. If the pressure loss exceeds 2 psi within the weld void during air pressure testing, the outside weld edge (not free edge) shall be sprayed with a soap solution and visually examined for bubbles. If no bubbles appear, the problem is with the inside weld and the seam is acceptable. If any bubbles appear, the defect shall be repaired by extrusion welding and tested by vacuum box and spark detector.

If pressure loss is not more than 2 psi, the opposite end of the seam will be punctured to release the air. If a blockage is present, it will be located and tests on both sides of the blockage will be completed. All penetration holes created during testing shall be sealed by patching and extrusion welding.

Electrical Leak Location Survey

To aid in CQA monitoring of the geomembrane construction, an independent contractor will conduct an electrical leak location survey as part of the final quality control for the geomembrane installation. The method is designed to identify holes in the geomembrane liner after the LCRS gravel, or LCRS gravel and operations layer soil, has been placed. The leak location survey contractor will make point-by-point electrical measurements on the soil above and below the liner. By this process, because the geomembrane liner is an electrical insulator, current will flow only through leaks in the liner, producing localized anomalous areas of high current density near the leaks. Any identified electrical anomaly will be investigated and the liner repaired as described in Section 6.1.6, as necessary.

Responsibilities of the Geotechnical CQA Monitors

The Geotechnical CQA Monitor/Officer shall:

- Observe and record the continuity of all testing.
- Record the location seam/panel number, date, time, equipment number, Geotechnical CQA Monitor name , test number, welding technician's name, weld, sheet and ambient temperatures and results of all testing on appropriate forms (Form B-7 attached).
- Mark the failed areas with a waterproof marker compatible with the lining material and inform the Contractor and/or Liner Subcontractor and the Construction Manager of any required repairs.

- Observe that all testing is completed in accordance with the Project Specifications.

- Observe that all repairs are completed and tested in accordance with the Project Specifications.

6.1.5.2 Destructive Seam Testing

Destructive seam tests shall be performed at selected locations. The purpose of these tests is to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of all field seaming.

Destructive sampling involves samples which have been removed from the installed field seams by the Contractor/Liner Subcontractor. Test locations shall be determined at the discretion of the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor shall not be informed in advance of the locations where the seam samples will be made or will be removed.

Destructive samples shall be delivered to the Geotechnical CQA Officer by the Contractor/Liner Subcontractor and shipped to the Independent Testing Laboratory. All costs associated with the collection, repair, shipping and testing of destructive samples will be borne by the Contractor/Liner Subcontractor.

A minimum of one destructive sample per 500 feet of field seam shall be obtained. This average frequency will be used for the entire installation with the actual frequency of samples based on performance as determined by the Geotechnical CQA Officer.

Additional samples may be removed if the Geotechnical CQA Monitor observes a suspect seam.

6.1.5.3 Sampling Procedures

Samples shall be made or removed by the Contractor/Liner Subcontractor at locations selected by the Geotechnical CQA Monitors as the seaming operation progresses. The Geotechnical CQA Monitor shall:

- Observe making and/or removal of samples.

- Mark each sample with an identifying number which contains the seam number. (For nondestructive samples the seam number welded just prior to making a sample will be marked on the sample).

- Record sample locations on the panel layout drawing and enter the information on a Destructive Sample Log Form.

- Record the sample location, date and time taken, weather conditions, and reason the sample was made and/or taken (e.g., random sample, visual appearance, result of a previous failure, etc.).

- Mark sample identifying number on HDPE adjacent to the location where the sample was taken.

All holes in the HDPE resulting from destructive seam sampling shall be immediately repaired in accordance with repair procedures described herein. The continuity of the new seams in the repaired area shall be tested according to procedures described herein.

6.1.5.4 Size of Samples

Two types of samples shall be made or removed at each location. First, two samples shall be removed for field testing. Each of these samples shall be 1 inch wide with a length of 12 inches plus the seam width. For destructive sampling, the sample shall be taken perpendicular to the seam and the distance between these two samples shall be 38 inches. Samples designated for laboratory testing shall be that portion of seam located between the two samples taken for field testing. The samples for laboratory testing shall be 36 inches long with a width of 12 inches plus the seam width. The seam shall be centered lengthwise. The samples for laboratory testing shall be cut into three equal parts and distributed as follows:

- One part for the Independent Testing Laboratory for testing.
- One part to the Contractor/Liner Subcontractor.
- One part to the Construction Manager for archive storage.

6.1.5.5 Field Testing

The two 1 inch wide samples shall be tested in the field for peel adhesion and bonded seam strength (shear) by the Contractor/Liner Subcontractor, and shall not fail in the seam, but shall have a film tearing bond (FTB). If one or both of the samples fails in either peel or shear, the Contractor/Liner Subcontractor can, at his/her discretion, (1) reconstruct or cap strip the seam between passed test locations, or (2) take two additional test samples 10 feet on either side of the point of the failed test and repeat this procedure. If the second test passes, the Contractor/Liner Subcontractor shall reconstruct or cap strip the same between the two passed test locations. If subsequent tests fail, the procedure is repeated until the length of the poor quality seam is established. Repeated failures indicate that either the seaming equipment and/or operator is not performing properly, and appropriate action shall be taken.

6.1.5.6 Laboratory Testing

Once the field tests have passed, a sample shall be recovered from between passing field sample locations for testing by the Independent Testing Laboratory. Destructive test samples shall be packaged and shipped to the laboratory by the Geotechnical CQA Monitors and will be handled in a manner which will not damage the test sample. The Construction Manager will be responsible for storing the archive samples.

All specimens of a field weld sample tested by the Independent Testing Laboratory shall pass. If any specimen fails, the entire sample shall be considered as a failure, and the field weld shall be rejected. In this event, the field seam(s) shall be rejected as being nonconformant with the Specifications, and corrective measures shall be implemented.

For destructive samples which have failed, corrective measures shall include a rerun of the weld test using the same sample. If the second test passes, the Geotechnical CQA Monitor may assume an error was made in the first test and the field seam may be accepted. If the second test fails, the Contractor/Liner Subcontractor shall reconstruct or cap strip the field seam between any two previous passed seam locations which include the failed seam or shall go on both sides of the failed seam location (10-feet minimum), take another sample each side and test both in the independent laboratory.

If both samples pass, the Contractor/Liner Subcontractor shall reconstruct or cap strip the field seam between the two passing locations. If either fails, the Contractor/Liner Subcontractor shall repeat the process of taking samples for testing by the Independent Testing Laboratory. In all cases, acceptable field seams must be bounded by two passed test locations. In cases involving more than 50 feet of reconstructed or cap stripped seam, the reconstructed or cap stripped seam shall also be tested. The results of the Independent Testing Laboratory govern seam acceptance. In no case shall field testing of installed seams be used for final acceptance.

Testing shall include peel adhesion and bonded seam strength (shear; ASTM D6392). At least five specimens each shall be tested for peel and sheer. Minimum test values are presented in the Specifications. The Independent Testing Laboratory shall provide test results within 24 hours after receipt of samples for testing. Certified test results shall be provided within 5 days. The Geotechnical CQA Monitor shall document all test results on an appropriate form (Form B-8 attached) and shall immediately notify the Geotechnical CQA Officer, Construction Manager and/or Contractor/Liner Subcontractor in the event of a failed test.

The Contractor/Liner Subcontractor's laboratory test results shall be presented to the Geotechnical CQA Officer for comments.

6.1.6 DEFECTS AND REPAIRS

6.1.6.1 Identification

All seams and non-seam areas of the HDPE shall be examined by the Geotechnical CQA Monitors for identification of defects, holes, blisters, undispersed raw materials and any sign of contamination by foreign matter. Because light reflected by the HDPE helps to detect defects, the surface of the HDPE shall be clean at the time of examination. The HDPE surface shall be cleaned by the Contractor/Liner Subcontractor if the amount of dust or mud inhibits examination.

Each suspect location as identified by the Geotechnical CQA Monitors, both in seam and non-seam areas, shall be non-destructively tested using the methods described herein, as appropriate. Each location which fails the nondestructive testing shall be marked by the Geotechnical CQA Monitor and then repaired and re-tested by the Contractor/Liner Subcontractor. Work shall not proceed with any materials which will cover locations which have been repaired until laboratory test results with passing values have been obtained.

6.1.6.2 Repair Procedures

Any portion of the HDPE with a flaw or which fails a nondestructive or destructive test shall be repaired in accordance with the Specifications. The Geotechnical CQA Monitor shall locate and describe all repairs on the appropriate forms. Repair procedures include:

- Patching - used to repair large holes, tears, large panel defects, and destructive sample locations which are less than 25 sq. feet in total area.
- Extrusion - used to repair relatively small defects in panels and seams.
- Capping - used to repair failed welds or liner seams where welds cannot be non-destructively tested.
- Removal - used to replace areas with large defects where the preceding methods are not appropriate. Also used to remove excess material (wrinkles) from the installed HDPE.

6.1.6.3 Seam Test Summary

Documentation of all nondestructive and destructive seam testing results, including repairs, shall be summarized by the Geotechnical CQA Officer on Form B-9 attached.

6.1.7 WRINKLES

When placing soil or drain materials over the HDPE, temperature changes or creep may cause wrinkles to develop in the HDPE. Any wrinkles which can fold over shall be repaired either by cutting out excess material or, if possible, allowing the HDPE to contract due to temperature reduction. In no case shall material be placed over the HDPE which could result in the HDPE folding. All folded HDPE shall be removed. No material shall be placed in areas where liner is not in contact with the supporting subgrade.

6.1.8 ANCHOR TRENCH

The anchor trench shall be adequately drained to prevent ponding or softening of the adjacent soils while the trench is open. The anchor trench shall be backfilled and compacted as outlined in the Specifications. Fill soils shall consist of on-site granular soil essentially free of organic and deleterious material and approved by the Geotechnical CQA Monitor and Construction Manager. The material shall have a maximum particle size of 1 inch.

Care shall be taken when backfilling the trenches to prevent any damage to the geosynthetics. The Geotechnical CQA Monitor shall observe the bottom of the trenches prior to fill placement to ensure they are free of loose and disturbed materials. The Geotechnical CQA Monitor shall also observe the backfilling and compaction operation, and shall notify the Geotechnical CQA Officer and the Construction Manager of work performed not in accordance with the Project Specifications.

6.1.9 HDPE ACCEPTANCE

The Contractor/Liner Subcontractor shall retain all ownership and responsibility for the HDPE until acceptance by the Owner. The HDPE shall be accepted by Owner when:

- The installation is finished and approved.
- All seams have been inspected and approved.
- All required laboratory tests have been completed and approved.

- All required Contractor/Liner Subcontractor supplied documentation has been received and approved.

- All record drawings have been completed and approved.

6.1.10 LINER MATERIALS

The Geotechnical CQA procedures indicated in this section are intended to allow the installation of materials in contact with the HDPE without causing damage to it.

Important points for Quality Assurance of materials in contact with HDPE include:

- A geotextile or drainage medium approved by the Construction Manager shall be installed above the HDPE.

- Equipment used for placing soil shall not be driven directly on the HDPE/geotextile.

- In heavily trafficked areas, such as access ramps, soil thickness should be at least three (3) feet over the geosynthetics.

- Placement of soils, gravels, sand or other types of earth materials on top of the HDPE/geotextile shall not be performed until all destructive and nondestructive testing has been performed and accepted.

- Placement of overlying earth materials shall be performed in a manner to minimize wrinkles. Equipment operators shall be briefed on methods of placement relative to thermal expansion and contraction of the HDPE.

- Soil material(s) placed on top of the HDPE/geotextile shall be stockpiled and displaced off the stockpile to create a cascading effect of the material on top of the HDPE/geotextile.

The Geotechnical CQA Monitors shall inform the Geotechnical CQA Officer if the above conditions are not fulfilled.

6.2 GEOSYNTHETIC CLAY LINER (GCL)

The Contractor/GCL Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet for geotextile and bentonite materials which includes all specified properties measured using test methods indicated in the Project Specifications.

- Certificates for raw bentonite and geotextile materials which indicate that materials provided meet or exceed all applicable specification requirements.
- Manufacturer's Quality Control Certificates.
- Internal shear strength certificate in accordance with specification requirements.
- A panel placement plan.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the GCL Manufacturer meet or exceed the Project Specifications.
- The measurement of properties by the GCL Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/GCL Manufacturer shall provide the Construction Manager with a quality control certificate for each GCL roll which is intended for use on the project. The quality control certificate(s) shall be signed by a responsible person employed by the Manufacturer, and shall include roll numbers and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the Project Specifications.

6.2.1 GCL DELIVERY

The Contractor/GCL Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of GCL material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the material.
- Care is used to unload the rolls.
- All documentation required by the specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitor(s) shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitor(s) shall report to the Construction

Any damaged rolls shall be rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the Manufacturer shall also be stored at a separate location until all documentation has been received and approved. A log of the GCL material(s) received shall be maintained by the Geotechnical CQA Monitor(s).

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of Manufacturer, weather, animals and other sources. The Geotechnical CQA Monitor(s) shall observe that the materials are stored in accordance with Manufacturers recommendations and are protected against damage pursuant to ASTM D4873.

6.2.2 GCL CONFORMANCE TESTING

6.2.2.1 Tests

Upon delivery of the GCL material(s), the Geotechnical CQA Monitor shall ensure that the Contractor obtains and forwards samples to the approved Independent Testing Laboratory for testing of conformance with the design specifications. Conformance tests, including interface direct shear, will be performed as detailed in the Project Specifications.

Where optional procedures are noted in the test method, the requirements of the specifications shall prevail. Updated or alternative test methods may be used to determine the physical properties of the GCL materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer.

6.2.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll(s) and shall not include the first three feet. Unless otherwise specified, samples shall be three (3) feet long by the roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturers roll identification number.

6.2.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the GCL

material represented by the sample shall be considered non-conformant with the specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the GCL material can be accepted. If the second test fails, the Contractor/GCL Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.2.3 GCL INSTALLATION

6.2.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitor(s) shall observe that:

- All lines and grades have been verified by the project surveyor.
- The supporting surface does not contain rocks or irregular surfaces which could damage the GCL.
- There are no excessive soft spots or ponded water which could result in damage to the GCL.
- The Contractor/GCL Subcontractor has certified in writing that the surface on which the GCL will be installed is acceptable.
- The Contractor/GCL Subcontractor shall give each GCL panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitor(s) and the Contractor/GCL Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports and panel numbers.

During placement, the Geotechnical CQA Monitor(s) shall:

- Observe the GCL as it is placed and record all defects and disposition of the defects (panel rejects, patch installed, etc.). All repairs are to be made in accordance with the Project Specifications.
- Observe that Manufacturer's defects do not exceed that allowed by the Project Specifications.
- Observe that equipment used does not damage the GCL by handling, traffic, leakage of hydrocarbons, or other means.

- Observe that people working during installation of the GCL do not smoke, wear shoes that could damage the GCL, or engage in other activities that could damage the GCL.
- Observe that the GCL is anchored to prevent movement by the wind.
- Observe that adjacent panels of GCL are properly overlapped and the proper amount and type of bentonite is installed along the full length of all seams.
- Observe that the number of panels deployed are covered and protected from moisture at the end of the work day.

The Geotechnical CQA Monitor(s) shall inform both the Contractor/GCL Subcontractor and the Construction Manager if the above minimum conditions are not met.

The Contractor/GCL Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No GCL shall be placed until the panel layout plan has been approved by the Construction Manager. During panel placement, the Geotechnical CQA Monitor(s) shall also observe the following:

- That GCL material is cut with an approved GCL cutter, and is not torn or ripped.
- The bentonite to be used on all seams meets the requirements of the Project Specifications.
- That the panels are overlapped and sealed in accordance with the Project Plans and Specifications.

6.2.4 REPAIRS

Any necessary repairs to the GCL shall be made with approved GCL material, using approved overlaps, materials, equipment and techniques. The patch size shall be 12 inches or larger in all directions than the area to be patched.

6.3 GEOTEXTILES

The Contractor/Liner Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet which includes all specified properties measured using test methods indicated in the specifications.
- A description of the sampling procedure and appropriate test results.

- A certification that values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet or exceed the project specifications.
- The measurement of properties by the Liner Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geotextile. The quality control certificate shall be signed by a responsible person employed by the Liner Manufacturer, and shall include roll number and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the project specifications.

6.3.1 GEOTEXTILE DELIVERY

The Contractor/Liner Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of geotextile material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the geotextile.
- Care is used to unload the rolls.
- All documentation required by the Specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitors shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitors shall indicate to the Geotechnical CQA Officer any rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws. These rolls shall be clearly marked as rejected.

Any damaged rolls shall be rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the manufacturer shall also be stored at a separate location until all documentation has been received and

approved. A log of the geotextile material(s) received shall be maintained by the Geotechnical CQA Monitors on an appropriate form (Form B-10 attached).

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the material is not stored directly on the ground and that storage of the geotextile provides protection against damage pursuant to ASTM D4873.

6.3.2 GEOTEXTILE CONFORMANCE TESTING

6.3.2.1 Tests

Upon delivery of the geotextile, the Geotechnical CQA Monitor shall ensure that samples are obtained and forwarded to an Independent Laboratory for testing of conformance with the design specifications. As a minimum, the following tests will be performed to ensure that geotextile materials are in conformance with the design specifications.

- Thickness (ASTM D1777)
- Mass per unit Area (ASTM D3776)
- Burst Strength (ASTM D3786)
- Puncture Strength (ASTM D4833)
- Permittivity (ASTM D4491)
- Grab Tensile Tests (ASTM D4632)
- Apparent Opening Size (ASTM D4751)
- Appropriate interface shear testing as noted of the Specifications

Where optional procedures are noted in the test method, the requirements of the Specifications shall prevail. Updated or alternative ASTM Test Methods may be used to determine the physical properties of the geotextile materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer on an appropriate form (Form B-11 attached).

6.3.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be three feet long by the roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturer's roll identification number.

Unless otherwise specified, samples shall be taken at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of samples.

6.3.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the geotextile material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the geotextile material can be accepted. If the second test fails, the Contractor/Liner Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.3.3 GEOTEXTILE INSTALLATION

6.3.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitors shall observe that:

- All lines and grades have been verified.
- The subgrade has been prepared in accordance with the Project Specifications and the supporting surface does not contain rocks or irregular surfaces which could damage the geotextile.
- There are no excessively soft areas which could result in damage to the geotextile.
- The Contractor/Liner Subcontractor has certified in writing that the surface on which the geotextile will be installed is acceptable.

6.3.3.2 Placement

The Contractor/Subcontractor shall give each geotextile panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports, and panel numbers on an appropriate form (Form B-12 attached).

During panel placement, the Geotechnical CQA Monitor shall:

- Observe the geotextile as it is placed and record all defects and disposition of the defects (panel rejected, patch installed, etc.). All repairs are to be made in accordance with the Specifications.

- Observe that equipment used does not damage the geotextile by handling, traffic, leakage of hydrocarbons, or other means;

- Observe that people working during installation of geotextile do not smoke, wear shoes that could damage the geotextile, or engage in other activities that could damage the geotextile

- Observe that the geotextile is anchored to prevent movement by the wind.

- Observe that adjacent panels of geotextile are overlapped a minimum of 18 inches where the fabric is not seamed (welded or sewn). When seamed, a three inch minimum overlap will be required.

The Geotechnical CQA Monitors shall inform both the Contractor/Liner Subcontractor and the Geotechnical CQA Officer if the above minimum conditions are not met.

The Contractor/Liner Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No geotextile shall be placed until the panel layout plan has been approved by the Construction Manager. During geotextile placement, the Geotechnical CQA Monitors shall observe that:

- The geotextile is cut only with an approved geotextile cutter, and is not torn or ripped.

- The thread and sewing machinery meet the Project requirements (if sewing is the elected method of joining panels).

- The panels are being overlapped or joined in accordance with the Project Plans and Specifications.

- Any roll of geotextile with a tear exceeding 10 percent of roll width is removed and replaced.

6.3.4 REPAIRS

Any necessary repairs to the geotextile shall be made with the geotextile material itself, using approved overlaps or sewing systems, equipment and techniques. The patch size shall be 18 inches or larger in all directions than the area to be patched and all corners shall be rounded.

6.4 GEOCOMPOSITE

The Contractor/Liner Manufacturer shall provide the Construction Manager with the following documentation:

- A properties sheet which includes all specified properties measured using test methods indicated in the specifications.
- A description of the sampling procedure and appropriate test results.
- A certification that values given in the properties sheet are guaranteed by the Liner Manufacturer.

The Geotechnical CQA Officer shall verify that:

- The property values certified by the Liner Manufacturer meet or exceed the project specifications.
- The measurement of properties by the Liner Manufacturer are properly documented and the test methods used are acceptable.

Prior to shipment, the Contractor/Liner Manufacturer shall provide the Construction Manager with a quality control certificate for each roll of geocomposite. The quality control certificate shall be signed by a responsible person employed by the Liner Manufacturer, and shall include roll number and identification.

The Geotechnical CQA Officer shall:

- Verify that the quality control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls to be delivered.
- Review the quality control certificates and verify that the certified roll properties meet the project specifications.

6.4.1 GEOCOMPOSITE DELIVERY

The Contractor/Liner Subcontractor shall submit for approval by the Construction Manager, method(s) for handling and storage of geocomposite material(s) prior to installation. The Geotechnical CQA Monitor shall observe that:

- Equipment used to unload the rolls will not damage the geocomposite.
- Care is used to unload the rolls.
- All documentation required by the Specifications has been received.

Upon delivery at the site, the Geotechnical CQA Monitors shall conduct a surface inspection of all rolls for defects and damage. This inspection shall be conducted without unrolling rolls unless defects or damage are found or suspected. The Geotechnical CQA Monitors shall indicate to the Geotechnical CQA Officer any

rolls, or portions thereof, which should be rejected and removed from the site because they have severe flaws.

Any damaged rolls shall be marked as rejected and removed from the site or stored at a location, designated by the Construction Manager separate from accepted rolls. All rolls which do not have proper documentation from the manufacturer shall also be stored at a separate location until all documentation has been received and approved. A log of the geocomposite material(s) received shall be maintained by the Geotechnical CQA Monitors.

The Construction Manager shall designate storage space in a location (or several locations) on-site. Storage space shall be protected by the Contractor from theft, vandalism, damage from the actions of man, weather, animals and other sources. The Geotechnical CQA Monitors shall observe that the material is not stored directly on the ground and that storage of the geocomposite provides protection against damage pursuant to ASTM D4873.

6.4.2 GEOCOMPOSITE CONFORMANCE TESTING

6.4.2.1 Tests

Upon delivery of the geocomposite, the Geotechnical CQA Monitor shall ensure that samples are obtained and forwarded to a GAI certified Independent Laboratory for testing of conformance with the design specifications. Conformance sampling and testing will be conducted in accordance with Section D of the Project Specifications.

- Thickness (ASTM D1777)
- Mass per unit area (ASTM D3776)
- Hydraulic Transmissivity (ASTM D4716
- Carbon Black Content (ASTM D1603)
- Tensile Strength (machine direction; ASTM D1682)

Where optional procedures are noted in the test method, the requirements of the Specifications shall prevail. Updated or alternative ASTM Test Methods may be used to determine the physical properties of the geocomposite materials at the discretion of the Construction Manager.

The results of Conformance Testing will be documented by the Geotechnical CQA Officer.

6.4.2.2 Sampling Procedures

Samples shall be taken across the entire width of the roll and shall not include the first three feet. Unless otherwise specified, samples shall be three feet long by the

roll width. The Geotechnical CQA Monitor shall mark the machine direction on the samples with an arrow, and the Manufacturer's roll identification number.

Unless otherwise specified, samples shall be taken at a rate of one per lot or one per 100,000 square feet, whichever results in the greater number of samples.

6.4.2.3 Test Results

The Geotechnical CQA Officer shall examine all results from the laboratory conformance testing. All specimens tested shall pass. If any specimen fails, the entire sample shall be considered as a failure and rejected. In this event, the geocomposite material represented by the sample shall be considered nonconformant with the Specifications, and corrective measures shall be implemented. Corrective measures shall include a rerun of the conformance testing using a portion of the same sample. If the second test passes, the Geotechnical CQA Officer may assume an error was made in the first test and the geotextile material can be accepted. If the second test fails, the Contractor/Liner Subcontractor shall remove all material represented by the sample from the work area. The decision of the Construction Manager shall be final.

6.4.3 GEOCOMPOSITE INSTALLATION

6.4.3.1 Surface Preparation

Prior to installation, the Construction Manager and Geotechnical CQA Monitors shall observe that:

- All lines and grades have been verified.
- The subgrade has been prepared in accordance with the Project Specifications and the supporting surface does not contain rocks or irregular surfaces which could damage the geocomposite.
- There are no excessively soft areas which could result in damage to the geocomposite.
- All construction stakes and hubs have been removed.
- The Contractor/Liner Subcontractor has certified in writing that the surface on which the geocomposite will be installed is acceptable.

6.4.3.2 Placement

The Contractor/Subcontractor shall give each geocomposite panel an identification number which shall be agreed to and used by the Geotechnical CQA Monitors and the Contractor/Liner Subcontractor. The Geotechnical CQA Monitor shall establish a chart showing correspondence between roll numbers, certification reports, and panel numbers.

During panel placement, the Geotechnical CQA Monitor shall:

- Observe the geocomposite as it is placed and record all defects and disposition of the defects (panel rejected, patch installed, etc.). All repairs are to be made in accordance with the Specifications.
- Observe that equipment used does not damage the geocomposite by handling, traffic, leakage of hydrocarbons, or other means.
- Observe that people working during installation of geocomposite do not smoke, wear shoes that could damage the geocomposite, or engage in other activities that could damage the geocomposite.
- Observe that the geocomposite is anchored to prevent movement by the wind.
- Observe that adjacent panels of geocomposite are overlapped a minimum of 18 inches where the fabric is not seamed (welded or sewn). When seamed, a three inch minimum overlap will be required.

The Geotechnical CQA Monitors shall inform both the Contractor/Liner Subcontractor and the Geotechnical CQA Officer if the above minimum conditions are not met.

The Contractor/Liner Subcontractor shall provide the Construction Manager with a panel layout plan, and shall update this plan daily as the job proceeds. No geocomposite shall be placed until the panel layout plan has been approved by the Construction Manager. During geocomposite placement, the Geotechnical CQA Monitors shall observe that:

- The geocomposite is cut only with an approved cutter, and is not torn or ripped.
- Geocomposite seaming equipment meet the Project requirements.
- The panels are being overlapped or joined in accordance with the Project Plans and Specifications.
- Any damaged roll of geocomposite is removed and replaced.

6.4.4 REPAIRS

Any necessary repairs to the geocomposite shall be made with the geocomposite material itself, using approved overlaps or seaming systems, equipment, and techniques. The patch size shall be 18 inches or larger in all directions than the area to be patched and all corners shall be rounded.

7.0 DOCUMENTATION

The Geotechnical CQA Plan depends on thorough monitoring and documentation of all construction activities. Therefore, the Geotechnical CQA Officer shall document that all Geotechnical CQA requirements have been addressed and satisfied. Documentation shall consist of daily reports, construction problem reports, photographs, design and specification revisions, and a certification report.

7.1 DAILY SUMMARY REPORTS

Daily summary reports provide a chronological framework for identifying and recording all other reports and shall consist of field notes, summary of the daily meeting with the Contractor/Liner Subcontractor, observation and data sheets (including a record of field and/or laboratory tests) and construction corrective measures reports. This information shall be submitted daily to the Geotechnical CQA Officer for review and approval. The summary of the daily meeting with the Contractor/Liner Subcontractor shall include:

- Date, project name, and location.
- Names of parties attending.
- Scheduled activities.
- Items discussed.
- Signature of Geotechnical CQA Monitor.

The corrective measures report will include detailed descriptions of materials and/or workmanship that do not meet a specified design and will be cross referenced to the specific inspection data sheets where the problem was identified and corrected.

7.2 OBSERVATION AND TEST DATA REPORTS

Observation and test data reports shall include:

- Date, project name, and location.
- Weather data.
- A reduced scale site plan showing work areas, including sample and test locations.
- A description of ongoing construction.

- A summary of test results identified as passing, failing, or, in the event of a failed test, retest.
- Test equipment calibrations, if applicable.
- A summary of decisions regarding acceptance of the work and/or corrective actions taken.
- The signature of the Geotechnical CQA Monitor.

A summary of observation and test data reports shall be submitted on a schedule mutually agreeable to the Construction Manager and Geotechnical CQA Officer.

7.3 CONSTRUCTION CORRECTIVE MEASURES REPORTS

These reports identify and document construction problems and solutions. They are intended to document problems involving significant rework, and are not intended to document problems which are easily corrected unless the problems are recurring. Each report shall include:

- A detailed description of the problem.
- The location and cause of the problem
- The solution to the problem.
- The personnel involved.
- Signatures of the Geotechnical CQA Officer and Construction Manager.

7.4 DESIGN AND SPECIFICATION REVISIONS

Design and specification revisions may be required during construction. In such cases, the Geotechnical CQA Officer shall notify the Construction Manager. Design and specification revisions shall become official only after written approval of the Construction Manager.

7.5 PHOTOGRAPHS

Construction activities will be photographed, including significant problems and remedial actions. The photographs will be identified by location, time, date, and photographer.

7.6 AS-BUILT PLANS

As-built plans shall be prepared by the Contractor/Subcontractor from surveying and base maps prepared by a Registered Land Surveyor. The Geotechnical CQA Monitors shall observe that the "As-Built" plans include:

- Dimensions of all field panels;
- Location of each panel relative to the surveyor's plan;
- Identification of all panels and seams (including manufacturer's roll identification numbers);
- Location of all patches and repairs;
- Location of all nondestructive and destructive test sampling;
- Identification of problems or unusual conditions.

7.7 FINAL CERTIFICATION REPORT

At completion of the work, the Geotechnical CQA Officer shall prepare and submit a final certification report. This report shall render an opinion as to whether the work was performed in compliance with the project plans and specifications.

As a minimum, the final certification report shall include:

- A summary of all construction activities;
- Laboratory and field test results;
- Observation and test data sheets;
- Sampling and testing location plans;
- A description of significant construction problems and the solutions of these problems;
- A list of revisions from the construction plans and specifications, and the justification for these revisions;
- A certification statement signed and sealed by a Civil Engineer or Certified Engineering Geologist registered in the State of California.

Upon completion of construction, the facility will store all original documents so that they are protected from damage throughout the post-closure maintenance period, yet can be readily accessed.

GeoLogic Associates
Geologists, Hydrogeologists and Engineers

B-1
FML RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19299

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Geologists, Hydrogeologists and Engineers

B-1A
GCL RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19300

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B-1B
GEOCOMPOSITE RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot Number (Railcar)	AREA					CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumm. Sq. Ft. Rcvd. By Lot	Cumm. Sq. Ft. Rcvd. Total					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19301

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B-2
FML CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
FML Specification																
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19302

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B-2A
GCL CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19303

B-2B
GEOCOMPOSITE CONFORMANCE TEST

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PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq.Ft.	Status I/P/F	Remarks
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19304

B-4

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FML PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

19305

ACCEPTANCE OF SOIL SUBGRADE FOR THE SUPPORT OF GEOSYNTHETIC LINER (FML)

PROJECT NAME: GREGORY CANYON LANDFILL
COMPOSITE LINER SYSTEM CONSTRUCTION

LINER CONTRACTOR:
AREA APPROVED: _____

_____

_____

I, the undersigned, duly authorized representative of the LINER CONTRACTOR, accept the soil subgrade for the support of the geosynthetic liner in the aforementioned area. I shall be responsible for maintaining its integrity and suitability, in accordance with the project specifications from this date to completion of the installation in this area. I do not accept any responsibility for the conditions or character of the subsurface soil.

NAME (PRINT)	SIGNATURE	TITLE	DATE

ACKNOWLEDGED BY QA MONITOR

NAME (PRINT)	SIGNATURE	COMPANY/TITLE	DATE

B-4A

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GCL PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

19307

B-4B

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GEOCOMPOSITE PANEL PLACEMENT LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS				Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Feet	Y/N	Date Repaired	Date Tested	P/F		

Manufacturer:
Type:

Notes:

Checked By:

19308

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B-5
FML PANEL PLACEMENT LOG

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

CAP REPAIRED TESTED CHK'D BY: _____

PATCH REPAIRED TESTED EXTRUDATE REPAIRED TESTED

DATE:	TIME:	REMARKS
QA MONITOR:	AMB:	
PANEL #	ROLL #	

B-6
FML SEAM TRIAL WELDS

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Geologists, Hydrogeologists and Engineers

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Sample Number (Daily)	Date Completed	Welder Number	Technician	Time (AM/PM)	Temperature				Test Results						Remarks
					Ambient	Wedge	Extrudate	Preheat	Peel FTB	Strength (lbs/in)	Shear FTB	Strength (lbs/in)	Mils	QA Monitor	

19310

B-7

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Geologists, Hydrogeologists and Engineers

FML SEAMING LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Seam Number	Date Seamed	Seam Length feet	Equipment Number	Tech	Time Seamed	Wind Speed m.p.h.	Temperature		Non-Destructive Tests				Repairs			Destructive Sample				Status I/P/F/A
							Sheet Deg. F	Amb Deg. F	Probe/ VI	VT.	ST.	AP.	Yes/No	Date Repaired	Date Tested	Sample Number	P/F	Date Repaired	Date Tested	

NOTES:

VT –Vaccum Test
ST –Spark Test
AP–Air Pressure Test
VI –Visual Inspection

STATUS:

I –In Progress
P –Pass
F –Fail
A –As built In

Checked By:_____

Seam Length:

This page_____

Total previous page(s)_____

Grand Total:_____

B-8

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FML DESTRUCTIVE TEST SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Sample Number	Seam Type (wedge/ extrusion)	Date Seamed	Equipment Number	Tech	Seam Number	Ambient Temperature (Deg. F) at time seamed	Bonded Seam Strength		P/F	Seam Peel Adhesion		P/F	Remarks
							FTB	Strength (lbs./inch)		FTB/ (FTB+Peel)	Adhesion (lbs./inch)		

Type:

FTB – Film Tear Bond

Notes:

Checked By:

19312

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B-9
FML SEAMING LOG SUMMARY

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.		am/pm	m.p.h.	Sheet Deg. F	Amb Deg. F	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.		am/pm	m.p.h.	Sheet Deg. F	Amb Deg. F	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		

Seam Number	Seam Type	Date Seamed	Seam Length feet		Equipment		Tech	Time Seamed	Wind Speed	Temperature		Non-Destructive Tests			Repairs				Destructive Sample				Status I/P/F/A	QA Monitor
			Init.	As blt.	Number	Temp.		am/pm	m.p.h.	Sheet Deg. F	Amb Deg. F	Type*	Date	P/F	Y/N	Date Repaired	Date Tested	P/F	Sample Number	P/F	Date Repaired	Date Tested		

* – Note what type of test was used:

VT – Vaccum Test
ST – Spark Test
AP – Air Pressure Test

STATUS:

I – In Progress
P – Pass
F – Fail
A – As built In

SEAM TYPE:

EW – Extrusion Weld Seam
WW – Wedge Weld Seam

Checked By: ____________________

Seam Length (this page): ____________
Total (previous pages): ____________
Grand Total: ____________

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B-10
GEOTEXTILE RECEIVED

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date Received	QA Monitor	Roll Number	Lot/Batch Number	AREA				CQC Doc. Received	CQA Sample Sent to Lab	CQA Test Received	CQA Test Result	Status I/P/F
				Length feet	Width feet	Area sq. ft.	Cumulative Sq. Ft. Rcvd.					

Manufacturer:

Type:

CQC – Construction Quality Control
CQA – Construction Quality Assurance

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

19314

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B-11
GEOTEXTILE CONFORMANCE TEST

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Test Number	Date	Roll Number	Lot Number (Railcar)	Type								Roll Length feet	Roll Width feet	Material Represented Sq. ft.	Status I/P/F	Remarks
Specification																
Acceptable Limits																

Manufacturer:

Status:

I – In progress
P – Pass
F – Fail

Notes:

Checked By:

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Geologists, Hydrogeologists and Engineers

B-12
GEOTEXTILE PLACEMENT LOG

PROJECT NO.: 9539 PROJECT: GREGORY CANYON LANDFILL, COMPOSITE LINER SYSTEM CONSTRUCTION LOCATION: SAN DIEGO COUNTY, CA

Date	QA Monitor	Panel Number	Location (Work Area)	Roll Number	Lot/ Batch Number	AREA					REPAIRS			Date Covered	Remarks
						Length 1	Length 2	Width	Sq. Ft.	Cumm. Ft.	Yes/No	Date Repaired	Date Tested		

Manufacturer:
Type:

Notes:

Checked By:

19316

Class C with Compacted Clay Liner (CCL): Tight Control

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Class C Liner 300mm CCL 1.5mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	0.00000001	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.3	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	2		head loss across composite liner
Leakage	1.47993E-06	m3/s	Rowe (2012)
Leakage	127.87	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
639.33	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with CCL: Less Control

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Class C Liner 300mm CCL 1.5mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	0.00000001	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.3	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	2		head loss across composite liner
Leakage	5.95214E-05	m3/s	Rowe (2012)
Leakage	5142.65	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
25713.23	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with GCL: Tight Control: No cation exchange or erosion of bentonite

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Class C Liner 10mm GCL 1.5mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	31		head loss across composite liner
Leakage	7.08486E-07	m3/s	Rowe (2012)
Leakage	61.21	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
306.07	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		

Class C with GCL: Less Control: No cation exchange nor erosion of bentonite

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Class C Liner 10mm GCL 1.5mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	31		head loss across composite liner
Leakage	4.08031E-05	m3/s	Rowe (2012)
Leakage	3525.38	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
17626.92	litres per hectare per day – *liquid outputs could be limited by liquid inputs*		

Dam with CCL: Tight control

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Dam: 600mm CCL with 2mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	9.33		head loss across composite liner
Leakage	1.3713E-06	m3/s	Rowe (2012)
Leakage	118.48	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
592.40	litres per hectare per day		

Dam with CCL: Less control

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Dam: 600mm CCL with 2mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	9.33		head loss across composite liner
Leakage	4.89749E-05	m3/s	Rowe (2012)
Leakage	4231.43	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
21157.16	litres per hectare per day		

Dam with GCL: Tight control: No cation exchange: No erosion of bentonite

Institute of Waste Management of Southern Africa

Controlling for small wrinkles

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	14	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	1.16557E-06	m3/s	Rowe (2012)
Leakage	100.71	litres per wrinkle per day	
Say you have 5 wrinkles with holes per hectare			
503.53	litres per hectare per day		

Dam with GCL: Less control: No cation exchange: No erosion of bentonite

Institute of Waste Management of Southern Africa

Much bigger wrinkles

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	500	m	length of wrinkle
k	5E-11	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	6.71276E-05	m3/s	Rowe (2012)
Leakage	5799.83	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
28999.13	litres per hectare per day		

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Dam with GCL: Less control: Cation exchange: No erosion of bentonite

Institute of Waste Management of Southern Africa

Fewer wrinkles, but with cation exchange

Dam: 10mm GCL with 2mm HDPE geomembrane composite liner

L	100	m	length of wrinkle
k	0.00000002	m/s	permeability of underlying liner
b	0.2	m	half the width of the wrinkle
D	0.01	m	thickness of the liner and attenuation zone
Theta	2E-11	m2/s	transmissivity of the interface
hd	51		head loss across composite liner
Leakage	0.00414451	m3/s	Rowe (2012)
Leakage	358085.70	litres per wrinkle per day	
Say you have 2 wrinkles with holes per hectare			
716171.41	litres per hectare per day – *liquid outputs may be limited by emptying the dam*		

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Rowe (2012)

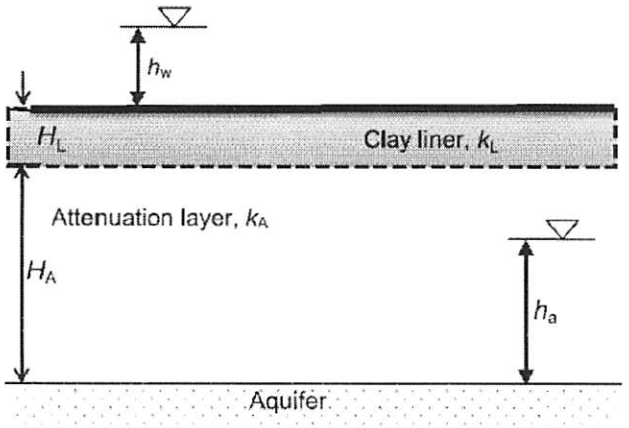

Table 12. Calculated leakage, Q, through selected composite liners for a hole in a connected wrinkle of length L for $h_w = 5$ m.

			Q (lphd)		
Case	k_L (m/s)	θ (m^2/s)	L = 100 m	L = 200 m	L = 700 m
CCL[a]	1×10^{-9}	1.6×10^{-8}	510	100	3600
	1×10^{-8}	1.0×10^{-7}	4100	8200	≥24 000
GCL[b]	5×10^{-11}	2×10^{-11}	70	140	490
	2×10^{-10}	2×10^{-11}	230	450	1600
	2×10^{-8}	2×10^{-11}	18 000	36 000	≥100 000
CCL[c]	1×10^{-9}	1.6×10^{-8}	510	1000	3600
	1×10^{-8}	1.0×10^{-7}	3400	6800	≥24 000
GCL[d]	5×10^{-11}	2×10^{-11}	70	140	490
	2×10^{-10}	2×10^{-11}	160	320	1100
	2×10^{-8}	2×10^{-11}	330	670	2300
GC–CC[e]	2×10^{-8}	2×10^{-11}	32	63	220

Note: Leakage calculated using eq. [6] and geometry as per schematic in Fig. 10 with $2b = 0.1$ m, hole $r_o = 5.6$ mm; calculated leakages have been rounded to two significant digits.

[a] $h_a = 0$ m, $H_L = 0.6$ m.

[b] $h_a = 0$ m, $H_L = 0.01$ m.

[c] $h_a = 3$ m, $H_L = 0.6$ m; $H_A + H_L = 3.75$ m.

[d] $h_a = 3$ m, $H_L = 0.01$ m; $H_A + H_L = 3.75$ m.

[e] 0.01 m GCL ($k_L = 2 \times 10^{-8}$ m/s) + 0.6m CCL ($k_L = 1 \times 10^{-9}$ m/s) + 3.14 m AL ($k = 1 \times 10^{-7}$ m/s).

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

Beware exposed dam liners

Institute of Waste Management of Southern Africa

- Wrinkling is essentially uncontrolled.
- Wrinkles tend not to creep back up slopes, so you often end up with a big wrinkle all along the inner toe, where the slopes meet the floor.
- Leakage rates from exposed liners are much higher than for covered liners with fewer wrinkles.
- Lots of other reasons to cover liners (durability, protection from mechanical damage, protection to underlying layers, theft less likely, etc, etc.)

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

Institute of Waste Management of Southern Africa

In terms of 2015 Regulations for Residue Deposits and Residue Stockpiles **"competent person"** means a person who-

(i) is qualified by virtue of his or her knowledge, expertise, qualifications, skills and experience; and

(ii) is knowledgeable with the provisions of the National Environmental Management Act, 1998 (Act No. 107 of 1998), National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), Mineral and Petroleum Resources Development Act, 2002 and other related legislation;

(iii) has been trained to recognise any potential or actual problem in the performance of the work; and

(iv) is registered with legislated regulatory body for the natural scientific profession or an appropriate legislated professional body.

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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Addition of sub-section 3(5)

"A competent person must recommend a pollution control barrier system suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis as contemplated in regulations 4 and 5 of the Regulations."

So you can have a non-engineer recommending your pollution control barrier system, who doesn't know what he/she doesn't know. Same applies for engineers don't understand the complexities of liner performance.

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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Circular reference would exist between 3(3) and 5(3)e:

- 3(3) "A risk analysis based on the characteristics and the classification set out in regulation 4 and 5 must be used to determine the appropriate mitigation and management measures."
- 5(3) "The classification of residue stockpile and residue deposit must be undertaken on the basis of the-

  e) pollution control barrier system determined as a result of the risk analysis as contemplated in regulations 4 and 5 of these Regulations."

Does this imply an iterative process?

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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3(3). requires a risk analysis in terms of 4 and 5.

3(5). requires recommendation of a pollution control barrier system by a competent person.

5(3). requires that the classification of the residue stockpile or residue deposit takes into account the pollution control barrier system determined as a result of the risk analysis.

7. covers the design of the residue deposit and residue stockpile but does not require that the engineer takes into account the risk analysis, classification or the recommendation of the pollution control barrier system.

9. requires the right or permit holder ensures the design is followed. *Do they have the expertise to know what is critical to liner performance and why?*

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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By deleting all references to the NEMWA National Norms and Standards for Disposal of Waste to Landfill, not only the liner designs are deleted, so are other requirements, such as:

- Service life considerations
- Efficiency of drainage layers
- Construction Quality Assurance
- Consideration of the compatibility of liner material with the waste stream, in particular noting the compatibility of natural and modified clay soils exposed to salts.

<u>These aspects are key to managing risk.</u>

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Issues with the Nov 2016 Draft Regulations for Residue Deposits and Residue Stockpiles

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- By removing references to the National Norms and Standards for the Assessment of Waste for Landfill Disposal, there is no clear classification system given in the draft.
- There are no requirements listed for what the risk analysis must include and the level of detail required.
- It's going to be difficult for the risk assessments to be reliable if inputs are not reliable, to put these risk assessments out to market, and for the authorities to assess them.

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Beware…

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Big money at stake – dishonesty could occur throughout the process, including by "professionals".

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Measuring leakage rates

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- Consider where, how and how often leakage rates need to be measured.
- Health and safety is key.
- Must have safe procedures in place.
- Use of flow meters is ideal but flow may be below range for some sites.
- Undertake considered design.

Management of leakage rates

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- Systems engineering approach
- Design
- Construction
- Operation
- Monitoring

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Systems engineering approach

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- Rowe and Hosney (2010) advocate adopting a systems engineering approach to landfill design.
- Any evaluation of leakage must consider how the interaction between different components of the landfill system affects leakage.
- Paper lists 10 factors to consider.

Rowe, R.K. and Hosney, M.S. (2010). A systems approach to minimizing leachate leakage from landfills, 9th International Conference on Geosynthetics, Brazil, 2010, pp 501-510.

Design

Institute of Waste Management of Southern Africa

- Separate clean and dirty water.
- Design efficient drainage systems.
- Separate leachate and leakage drainage systems to avoid short-circuiting.
- Consider slope stability, and design to avoid liner tears.
- Avoid exposed geomembranes to limit wrinkling and increase service life.

19338

Design

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- Select & specify good quality materials.
- Consider chemical compatibility.
- Consider material-specific limitations.
- Design for reduced performance with time.
- Consider links between elements.
- Consider constructability.
- Temperature effects?

Construction

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- Appoint experienced contractors.
- Appoint knowledgable, diligent quality assurance personnel.
- Develop and implement thorough construction quality assurance plans.
- Foster a culture where honesty is the best policy.

19340

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Construction

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- Ensure specifications are adhered to.
- Store materials properly.
- Limit geomembrane wrinkling as much as possible.
- Don't allow uninformed design changes.
- Implement reasonable working hours.
- Collect and report on statistics.

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Operation

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- Include assumptions from design in operating documentation.
- Supervise initial filling over liners.
- Maintain systems to work efficiently.
- Know where the lined area is, and mark infrastructure clearly.
- Cover exposed liners to avoid damage and theft.

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Operation

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- Train, retrain and retrain all site staff so they understand why and how liners should be protected, why and how the site drainage systems work, etc.
- Fire breaks, emergency planning and fast emergency response times are necessary to avoid fire damage.

Monitoring

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- Use the actual versus action leakage rates to determine if there are issues with the facility.
- May allow intervention before environmental impacts occur.
- Use results to improve design for subsequent phases.

19344

In summary

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- Leakage rate ranges can and should be determined in the assessment, design and application process.
- Leakage rates can and should be managed through good design, construction, operation, rehabilitation and monitoring.

GIGSA

Institute of Waste Management of Southern Africa

- Geosynthetic Interest Group of South Africa provides a lot of information and annual training courses on various aspects of geosynthetics including liners.
- www.gigsa.org

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Institute of
Waste Management
of Southern Africa

THANK YOU
QUESTIONS?

Riva Nortjé MScEng (Civil) PrEng
Associate, Waste & Tailings
nortje@jaws.co.za

Jones & Wagener
Engineering & Environmental Consultants

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APPENDIX D

Tailings Impoundment Conceptual Design Report (Golder, 2010)

REPORT

COPPER FLAT PROJECT

Conceptual Design Report

Submitted To: New Mexico Copper Corporation
Suite 100 - 2425 San Pedro Dr. NE
Albuquerque, NM 87110

Submitted By: Golder Associates Inc.
4730 N. Oracle Road
Suite 210
Tucson, AZ, 85705 USA

Distribution:
1 Electronic Copy – New Mexico Copper Corporation
1 Copy – Golder Associates

November 17, 2010 **103-92557**

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Golder Associates

EXECUTIVE SUMMARY

Copper Flat is a porphyry copper mine that was briefly operated by Quintana Minerals Corp. (Quintana) in 1981 and 1982. After approximately 1 year of operation, mining was halted due to depressed copper prices, and the facility was decommissioned. New Mexico Copper Corporation (NMCC) has acquired an option on the Copper Flat property and is evaluating resuming mining and milling operations. Based on a recent NI 43-101 compliant preliminary economic assessment (PEA, [SRK, 2010]), the ore reserve has been increased from the 60 million tons identified by Quintana, to approximately 100 million tons. Ore will be mined at a rate of 17,500 tons per day (tpd). This report presents the conceptual design of a tailings storage facility (TSF) capable of supporting tailings disposal for the currently identified ore reserve.

During the 1981-82 operating period, high concentrations of total dissolved solids and sulfate were detected in groundwater immediately downgradient from the existing Quintana TSF. Local seepage of contaminated groundwater, which has been attributed to the existence of permeable geologic units in the TSF foundation, allowed process water and tailings seepage to migrate from the impoundment. Existing tailings are now drained and lie above the local groundwater table, however, leaching by meteoric water potentially contributes additional sulfate and dissolved solids to groundwater. Impacted groundwater and tailings from the 1981-82 operations are the subject of ongoing abatement actions. Groundwater compliance issues associated with the Quintana operation have led NMCC to propose construction of a lined TSF for future operations.

The starter dam from the earlier operations remains in place, however, in order to provide the required increase in storage capacity, while limiting future dam height and maintaining gravity delivery of tailings, the facility will be expanded approximately 1,000 feet to the east. It is assumed that the existing starter dam will be used as a borrow source for new embankment construction.

Approximately 1.2 million tons of tailings were placed in the north disposal cell prior to the suspension of operations in 1982. It is assumed that future TSF construction will require the incorporation of measures to mitigate potential groundwater impacts from existing tailings in order to meet groundwater contamination abatement actions. Several options for the management of existing tailings have been considered at a preliminary level. These include:

- Capping existing tailings in-place beneath a low permeability cover such as a geomembrane or composite cover;
- Utilize existing tailings as fine grained bedding fill for the future TSF geomembrane liner; and
- Place existing tailings inside the new TSF on top of the new geomembrane liner.

All options are considered to provide similar benefits relative to mitigating groundwater impacts associated with existing tailings.

The method of tailings embankment construction selected by Quintana was upstream raise construction with peripheral discharge of spigotted whole tailings. The proposed method of construction for the new TSF is by centerline raises with cycloned tailings sand. The tailings surface will rise approximately 80 feet in the first two years of operation. Centerline raising with cycloned sand was selected as the construction method because as a general rule, the tailings rate of rise should be less than 10 feet per year for upstream construction. NMCC's ability to develop a drained and consolidated foundation suitable for upstream raise construction using peripherally spigotted discharge of whole tailings is questionable due to the high rate of rise, which will not drop below 10 feet per year in the first 5 years of operation.

Initial construction will include a toe berm to buttress the tailings embankment and a starter dam for placement of the tailings header line and cyclones. Sand (cyclone underflow) will be placed on the embankment while the tailings slimes (cyclone overflow) will be discharged to the impoundment interior. The TSF geomembrane liner will be placed beneath the starter dam and anchored on the crest of the toe berm. An underdrain system consisting of a filter compatible soil and drainage collection pipes will be placed on top of the geomembrane liner, beneath the sand dam footprint, to facilitate drainage and consolidation of the cycloned sand. The underdrain system will extend into the impoundment interior in the area that will underlie the free water pond. Underdrainage will be routed to a lined underdrain collection pond located downstream of the toe berm.

The TSF can be constructed in a phased manner. During initial construction phases, diversion ditches can be constructed to divert stormwater from upstream catchment areas within the area contributory to the impoundment. The contributory area is approximately equivalent to the ultimate TSF footprint as only minor peripheral areas drain into the TSF. At final buildout, there is minimal potential for surface water runon from external areas. Throughout most of the life of the facility, stormwater management requirements will be limited to direct precipitation.

A review of available aerial photographs indicates no human habitations adjacent to the drainages below the proposed TSF. Based on the rules and regulations of the New Mexico State Engineer, the Copper Flat TSF would be classified as a large dam having significant hazard potential. The impoundment will be required to contain the equivalent of 75 percent of the probable maximum precipitation (PMP) during operations. A spillway capable of passing 75 percent of the PMP will be required upon closure.

Geotechnical investigation (SHB, 1980) of the existing TSF area was extensive, however, a portion of new TSF will occupy ground that has not been evaluated for geotechnical and hydrogeological conditions. A preliminary site investigation plan is presented in this conceptual design report.

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List of Drawings

1.0 INTRODUCTION

1.1 Scope of Work

New Mexico Copper Corporation (NMCC) has acquired an option on the Copper Flat property, located near Hillsboro in Sierra County, New Mexico. Copper Flat is a porphyry copper deposit that was briefly mined by Quintana Resources in 1981 and 1982 before depressed copper prices forced the suspension of mining and milling operations. During the Quintana operation, the identified ore reserve was approximately 60 million tons. Further drilling completed since cessation of mining operations has increased the ore reserve from 60 million to approximately 100 million tons. NMCC has commissioned Golder Associates Inc. (Golder) to develop the conceptual design of a new tailings storage facility (TSF) capable of containing tailings from the expanded mining operation. Conceptual design of the new TSF, as well as plans for geotechnical investigation of the expanded TSF footprint and fulfilling data collection requirements necessary to advance the TSF design to feasibility and construction level are presented in this report.

1.2 Project History

The Quintana operation included open pit mining, conventional milling and off-site shipment of copper concentrate. Tailings were thickened to a solids content of 50 percent by weight (oral communication, Jack Bailey, 10/02/2010) and transported by gravity flow to the existing TSF located approximately 1 mile east of the open pit. Impoundment construction and operation were typical of the industry practices of the day. Whole tailings were discharged into the impoundment via a tailings header line and spigots placed peripheral to the impoundment. The TSF constructed for the Quintana operation remains in-place to this date. Remaining facilities include the starter embankment, internal splitter dikes, concrete decant towers and presumably, buried under drain pipes. Approximately 1.2 million tons of tailings were deposited in the existing north tailings cell.

The tailings thickener is reported to have been partially decommissioned and buried. The tailings delivery system has been removed. The Greyback Wash diversion, electrical supply lines, a water supply well field and water supply pipeline, groundwater monitoring wells and pumpback wells also remain. Milling and processing facilities were decommissioned and removed from the site.

During Quintana operations, elevated sulfate and dissolved solids were detected in groundwater in the vicinity of the existing tailings dam. Permeable foundation materials encountered during site investigation and construction of the TSF have been identified as the potential pathway for seepage from the TSF, Meteoric water leaching of tailings from the Quintana operation potentially contributes additional sulfate and dissolved solids to local groundwater. Impacted groundwater and the existing tailings are the subject of an ongoing abatement action. Management of existing tailings to mitigate existing and ongoing groundwater impacts is considered a parallel objective of TSF design.

2.0 SITE DESCRIPTION

2.1 Existing Conditions

The location of the proposed TSF is shown on Drawings 1 and 2. Elevation in the TSF basin area ranges from approximately 5,160 feet above mean sea level (amsl) near the base of the toe berm to over 5,500 feet on the ridges northwest of the impoundment footprint. Natural slopes range from 2 horizontal to 1 vertical (2H:1V) adjacent to the perimeter ridges to less than 10H:1V in the lower portion of the basin.

Previous disturbance of the TSF area is widespread. Existing features can be seen in the aerial photograph on Drawing 1. Drawing 2 shows the location of the proposed TSF projected on existing topography. Placer mining disturbance that predates the Quintana operation can be seen in most of the drainages in the TSF basin, and other drainages radiating from the mine area. More recent disturbance associated with the Quintana mining operation includes tailings deposits, the old starter dam and splitter dikes, construction material borrow areas and tailings delivery and reclaim water pipeline routes. Two concrete decant towers and concrete reclaim pipe foundations also remain in place and while not visible, buried reclaim water pipes also occur. A series of monitoring wells have been placed around the toe of the old starter dam.

The TSF site is located in the upper reaches of a shallow basin. The basin is bounded by low hills on the southwest, west and north sides such that the ultimate TSF will occupy most of the area that could contribute surface water runoff to the TSF. While diversions will be required in the early stages of the operation to divert stormwater runoff, peripheral areas contributing stormwater runon during the later stages of the future operations will be limited to a few acres on the northwest side of the TSF.

2.2 TSF Area Geology and Foundation Conditions.

The existing TSF site was extensively explored by Sargent, Hauskins and Beckwith (SHB) in 1979 and 1980 as part of the SHB design effort. No additional field work was conducted as part of conceptual design efforts. The upper layer of soils in the vicinity of the existing starter dam consists of sandy materials. Surficial sand is underlain by a wedge of silty clays, clayey and clayey silts that appears to thicken in a easterly direction. Gravels underlie the silts and clays and outcrop in the upper portion of the TSF basin. These gravels appear to have been the borrow source for the existing dam.

Permeable basalt was encountered in the lower portion of the tailings basin. The basalt is presumed to occupy a paleo-drainage cut in the local foundation soils. It can be seen in outcrop and subcrop south of the existing splitter dike and was intercepted in several exploratory boreholes completed in the central starter dam area. Due to its permeable nature, the basalt has been identified as the likely pathway for seepage and contaminants from the existing impoundment. This potential was identified during the design of the existing impoundment, and an attempt was made to cap the basalt with fine grained, low permeability soils to inhibit seepage.

2.3 Climate

The Copper Flat property experiences on the order of 10 to 13 inches per year of precipitation with the majority of rainfall occurring in the summer months associated with short duration, high intensity thunderstorms. Winter rains are associated with Pacific storms that generally migrate from west to east across the desert southwest. Summer temperatures exceed 100 degrees while winters are generally mild with limited snow and ground freezing.

In general, evaporation exceeds precipitation in desert lowlands across the region. It is anticipated that the tailings impoundment will be operated at net negative water balance, with periodic, temporary accumulation of stormwater from direct precipitation. Stormwater will be recovered with tailings supernatant water and reused in milling and processing. The effect of stormwater accumulation will be a reduction in raw make-up water requirements.

3.0 PROPOSED TAILINGS STORAGE FACILITY DESCRIPTION

3.1 TSF Geometry

The proposed method of tailings embankment construction is by the method of centerline raises. The basis for selection of this method is due to the high rate of tailings rise that will be experienced during the first 3 to 4 years of operation. Construction by upstream raises typically requires a rate of tailings rise of approximately 10 feet per year or less in order to allow consolidation and drainage of impounded tailings, and the development of conditions suitable for supporting upstream raises. The centerline method of construction using cycloned sand will allow the embankment to be constructed on a foundation of well drained sand.

A toe berm will be constructed around the periphery of the TSF which will serve as a buttress to the embankment outslopes. An internal starter dam is proposed for placement of the tailings discharge header pipe. Tailings will be delivered at a rate of 17,500 tpd at an anticipated solids content of 50 percent by weight. At 92 percent availability, the annual tailings deposition rate will be 5.88 million tons.

Cyclones on the tailings header line will be used to separate the sand fraction (cyclone underflow) from the whole tailings stream. Tailings sand will be used for embankment construction while the fine fraction of the tailings, the tailing slimes (cyclone overflow), will be discharged into the impoundment interior. The resulting tailings impoundment surface will slope away from the embankment and force tailings supernatant and stormwater into the interior of the impoundment. The locations of the toe berm and starter dam are shown on Drawing 3.

The crest elevation of the starter dam and toe berm have initially been set at 5,220 feet amsl. Adjustments to the height of these structures will be evaluated in detailed design studies. Starter dam height will be determined by the dry freeboard required to maintain stormwater storage capacity and the volume of sand that will be available for dam construction during operations. The availability of sand will be determined by the degree of ore milling. A finer grind will reduce sand content and could require a higher initial starter dam height while a coarser grind will provide more sand and allow an increased rate of sand deposition. Toe berm height will be influenced by the stability of the tailings embankment. The embankment sand and underdrain will be placed over a geomembrane liner. Interface friction at the liner/subgrade and the liner/underdrain interfaces will be reduced relative to the friction developed at a soil to tailings interface. The berm may be required to buttress the embankment toe to enhance stability. Toe berm and initial starter dam heights will be evaluated when tailings products representative of the future processing plan are available for evaluation and geotechnical testing.

Above the elevation of the initial starter dam and toe berm, these structures will be constructed parallel to existing topography with a constant height above foundation level. Progressive lateral extension of the tailings distribution points up the starter dam will enable the dam to be raised in level manner.

Tailings gradation data presented in the various reports prepared for Quintana are somewhat contradictory. Based on metallurgical pilot studies conducted for Quintana and reported by SHB (1980), the sand fraction (the plus 200 standard sieve fraction) of the tailings is approximately 30 percent with 95 percent finer than 65 mesh (208 microns). Measurements collected by Quintana mill personnel between May and June of 1982 (oral communication, Jack Bailey, 10/1/2010) showed a minus 65 mesh fraction of 84 to 89 percent, suggesting a courser tailings grind with a higher sand fraction was produced under operating conditions. The gradation presented in the SHB geohydrological study (SHB, 1981) indicates tailings that are 100 percent finer than 65 mesh with a sand fraction of 55 percent. Preliminary volumetric estimates indicate that embankment construction will require approximately 15 percent of future tailings, suggesting that the centerline approach is feasible. Evaluation of tailings samples produced in pilot or bench scale simulation of future milling and processing will be required to verify sand availability throughout the life of the operation.

The impoundment has been sized based on a post-deposition dry density of 85 pounds per cubic foot (pcf). The estimated maximum final tailings surface elevation is 5,375 feet amsl. The maximum toe to crest height of the tailings embankment will be approximately 215 feet. At final buildout, the TSF and underdrain collection pond will occupy an area of approximately 541 acres. The anticipated configuration of the TSF at the end of mining and milling operations is shown on Drawing 4. TSF cross sections are shown on Drawing 5.

The tailings surface will slope inward from peripheral points of deposition at approximately ½ to 1 percent forming a depression in the interior of the impoundment. The internal depression will serve as a storage area for supernatant solutions and stormwater.

Embankment outslopes shown on the drawings are 2.67H:1V. Outslopes may also be subject to modification based on geotechnical testing of tailings properties.

3.2 Hazard Classification

The rules and regulations of the New Mexico State Engineer indicate that the Copper Flat TSF will be classified as having significant hazard potential. According to the New Mexico Administrative Code (19.25.12.10 B NMAC):

> *Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.*

The TSF lies within the Greyback Wash drainage. Inspection of aerial photographs (Google Earth) indicates no human habitations in or adjacent to Greyback Wash between the TSF facility and Caballo Lake, into which Greyback Wash ultimately discharges. A dam breach and flood routing analysis will be required by the State Engineer (19.25.11.12 C (1) NMAC) to verify this classification.

The spillway design flood for dams with significant hazard potential (19.25.12.11 C(1) (c) is 75 percent of the probable maximum precipitation (PMP). A preliminary estimate of the PMP is on the order of 25 inches. The TSF and ore processing facilities will be operated as a closed, non-discharging system during tailings disposal operations and storage capacity for the design storm event will be maintained within the TSF. A permanent spillway capable of passing the design flood will be required at closure after the tailings surface has been regraded and a reclamation cover is in place.

3.3 Site Preparation

The TSF will be a geomembrane lined structure. Site preparation will include clear and grubbing, salvage and stockpiling of topsoil and grading to prepare a smooth surface for geomembrane liner installation.

It is anticipated that the existing starter dam and associated splitter dikes will be used as a fill material borrow source for the new toe berm and starter dam. Additional borrow areas for structural fill, liner bedding materials and drainage media will be developed within the TSF footprint where possible. Previous geotechnical investigation of the site indicates a range of fine grained soils and granular materials occur within the existing disturbance area.

Approximately 1.2 million tons of tailings were discharged into the existing TSF during the Quintana operation. Existing tailings deposits will be evaluated as a source of liner bedding fill material. If placed or "capped" under a low permeability TSF liner, the potential for leaching sulfate and dissolved solids from existing tailings in the future will be alleviated. Alternatively, existing tailings could be placed on the new TSF liner however, utilization of the tailings as liner bedding fill material is anticipated to be less costly and will provide similar benefits in terms of mitigating leaching potential.

The existing decant towers will be demolished. Demolition debris will be buried locally or placed in a waste rock disposal facility. Demolition requirements for buried decant pipelines will be evaluated as part of ongoing site investigation and design efforts.

Existing wells in the TSF expansion will require abandonment in accordance with New Mexico Environment Department (NMED) Office of the State Engineer (OSE) regulations. For wells that intercept groundwater, this will include removal of casings if possible, and sealing the entire well bore with cement or bentonite grout placed by tremmie pipe. Approximately 18 wells appear to lie within the TSF expansion area.

3.4 TSF Liner System

Proposed liner system details for the TSF and underdrain collection pond are shown on Drawings 6 and 7. The TSF liner will consist of an HDPE geomembrane placed on a minimum 6-inch thick layer of liner bedding fill. Beneath the starter dam and embankment underdrain, an 80 mil (0.080 inches) geomembrane is proposed while within the impoundment interior, the geomembrane thickness will be 60 mil. The underdrain collection pond liner will consist of a lower 60 mil and upper 80 mil HDPE

geomembranes separated by a drain net. The drain net will route potential leakage through the upper liner to a leakage collection and recovery sump.

Geomembrane liner will be placed on a minimum 6-inch thick layer of liner bedding fill. As noted above, the liner bedding fill can be constructed with existing tailings if they meet moisture content and compaction requirements. Additional liner bedding fill material can be derived from crushing and/or screening of selected native soils. A minus 3/8-inch material is suitable for protection of the liner.

3.5 Underdrain System

An underdrain will be placed beneath the starter dam and cycloned sand embankment. The underdrain system is shown on Drawing 6. The purpose of the embankment underdrain is to facilitate drainage and consolidation of cycloned sand placed in the tailings embankment. The underdrain will consist of graded sand and gravel that is filter compatible with the tailings sand. A series of perforated drain pipes will be placed within the underdrain layer to carry tailings drainage to the underdrain collection pond.

The under drain will be extended into the impoundment interior beneath the area that will be occupied by the supernatant pool. Production of drainage material that is filter compatible with the tailings slimes discharged into the impoundment interior will not be feasible. The impoundment underdrain will be separated from the tailings slimes by a geotextile filter fabric cover. Impoundment underdrainage will be routed to the underdrain collection pond in a piping system that is separate from the embankment under drain.

The pond layout presented as part of the conceptual design has a capacity of over 40 million gallons and represents the maximum potential construction area required for underdrain pond installation. Water balance and drainage analyses that will be completed during engineering design studies will be used to determine the underdrain collection pond size required to manage tailings underdrainage.

3.6 Water Reclaim

A water reclaim ramp with be constructed on top of the TSF liner system. The ramp will provide access to the free water pool for reclaim of supernatant solution and stormwater. The ramp will be raised and extended as deposition continues and the impoundment surface rises. The reclaim pump works will be progressively moved northward as the operation proceeds.

The ramp will be constructed with borrowed fill or waste rock from the mining operation. A cushioning layer will be placed beneath the initial ramp fill to protect the underlying geomembrane. The ramp presents an opportunity to dispose of potentially acid generating waste rock in an environment where ongoing tailings disposal will result in the ramp fill being encapsulated within low permeability tailings slimes.

3.7 Tailings Distribution

It is anticipated that a new thickener will be constructed at the location of the Quintana thickener (Drawing 2) and a tailings delivery pipeline will be routed to the impoundment through the existing tailings delivery pipeline cut. At the impoundment, a wye in the delivery pipeline will allow the tailings to be directed to the east and west to the starter dam crest. A series of discharge points and cyclones around the periphery of the impoundment will be used to direct cyclone underflow to the tailings embankment and cyclone overflow into the impoundment interior. Discharge will be cycled around the impoundment to raise the embankment in a level manner.

Regrading and compaction of the cycloned sand deposited on the dam crest will be conducted on a regular basis to densify the tailings embankment and achieve the design embankment outslope.

Drawing 8 presents a height versus capacity plot for the new TSF. There is potential to increase the capacity of the TSF beyond that shown on the plot, however, distribution of tailings above the elevation of 5,375 feet amsl is likely to require pumping of the whole tailings slurry. In addition, a tailings booster pump may be required in the later years of operation to maintain adequate pressure for cyclone operation.

3.8 Surface Water, Underdrainage, Stormwater and Supernatant Management

The intent of design is to allow the TSF to be operated as a zero discharge facility. Drainage from the tailings will be collected in an underdrain system, routed to a lined underdrain collection pond and recycled as process water. Potential runon from peripheral contributory areas will be prevented from contacting the tailings and diverted into natural drainages. Stormwater, which will result primarily from direct precipitation and supernatant will be contained within the impoundment.

3.8.1 Surface Water Diversion

During initial construction, perimeter diversions will be constructed across the west periphery of the impoundment. The approximately location of Phase 1 surface water diversions is shown on Drawing 3. As the impoundment is expanded in subsequent construction phases, diversion ditches will be relocated westward.

Potential runoff from peripheral areas west of the impoundment during the later stages of operation will be evaluated during design studies. Where runon is significant, diversion ditches will be investigated.

As noted above, at final buildout the TSF will occupy the majority of the area that can contribute surface water runon into the tailings impoundment. Only limited areas west of the impoundment might require late stage and post-closure diversion.

3.8.2 Stormwater and Supernatant Management

During operations, capacity will be maintained within the TSF for storage of direct precipitation and tailings supernatant. Upon discharge into the impoundment, tailings will form a beach sloping away from the point of discharge at ½ to 1 percent. The resulting depression on the tailings surface in the interior of the impoundment will be used for water storage. Additional storage capacity, if needed, will be developed by maintaining reserve freeboard on the tailings embankment crest.

A detailed water balance will be developed as part of the design studies to evaluate internal storage and embankment freeboard requirements. Water balance inputs include process water inflows, direct precipitation and runon. Losses include process water reclaim, beach and tailings pond evaporation, underdrainage and entrainment of process water within the tailings pore space. The rates of underdrainage, entrainment and tailings supernatantliberation on discharge will be determined through geotechnical testing of representative tailings samples.

Water storage requirements include:

- Dead storage (water that cannot be recovered by the reclaim system);
- Storage of the normal process water inventory to facilitate continuous operations;
- Normal stormwater storage which will vary on a seasonal basis due to changes in monthly precipitation and evaporation rates; and
- Storage for the design storm event, which is currently assumed to be 75 percent of the PMP.

The water balance will be coupled with a discharge model that will track the rate of tailings rise and simulate beach slopes and the topography of the tailings surface. The water balance and discharge model can then be used to estimate internal storage capacity and requirements for embankment freeboard through the life of the facility.

4.0 CLOSURE AND RECLAMATION

The conceptual closure plan for the TSF is illustrated on Drawing 9. The conceptual closure plan includes the following:

- Final grading of embankment outslopes to establish erosion controls and controlled surface water drainage (best management practices);
- Placement of a soil or rock cover and revegetation of the embankment outslope;
- Placement of riprap and erosion controls in embankment surface water drainage facilities;
- Regrading or depositional modification of the impoundment surface to promote drainage to a permanent spillway;
- Placement and vegetation of a soil cover over the tailings surface;
- Armoring of surface drainage channels and implementation of best management practices for erosion control; and
- Management of underdrainage.

Final grading of the impoundment surface can be accomplished with earthmoving equipment, or through modification of tailings disposal patterns during the final years of operation. Tailings discharge from selected locations can be used to relocate the supernatant pool to a location adjacent to the post-closure spillway, thereby reducing grading requirements and limiting earthmoving operations in areas where working conditions are expected to be difficult due to the presence of soft and saturated tailings. At the location of the spillway shown on Drawing 9, a bedrock foundation is anticipated. If the spillway channel is erodible, grouted riprap or other erosion controls will be applied.

Consolidation seepage into the underdrain system can be anticipated to continue at declining rates for an indefinite period following the cessation of tailings disposal operations. Underdrainage will be pumped from the underdrain collection pond to the surface of the tailings impoundment where it can be evaporated or used for reclamation cover irrigation. When underdrainage is reduced to an acceptably low flow rate, the underdrain pipes beneath the embankment can be sealed with grout and the underdrain collection pond can be decommissioned.

5.0 DATA COLLECTION AND DESIGN STUDY REQUIREMENTS FOR ADVANCING TSF DESIGN

The following defines work to be completed to advance the design of the new TSF to feasibility study and construction level.

5.1 Geotechnical Investigation

5.1.1 Existing TSF Area

The area occupied by the Quintana TSF area was extensively investigated by SHB (1980). Approximately 30 boreholes were drilled along the starter dam alignment. The majority of the borings were completed by hollow stem auger (HSA) and locally included in-situ permeability testing and diamond coring. Additional borings were completed in the impoundment interior. Test pits were excavated inside the impoundment on an approximate 500 foot by 500 foot grid.

Additional exploration will be undertaken in the area investigated by SHB to identify borrow areas for liner bedding fill and drainage media. This work is expected to require a test pit exploration program with native soil samples subjected to gradation analysis, Atterburg limits, permeability and compaction testing. This program will include sampling of existing tailings for compaction and permeability testing.

TSF Expansion Area investigation should include the following:

- A seismic velocity survey to evaluate the depth to bedrock and/or competent materials beneath the new embankment axis;
- Hollow stem auger drilling with standard penetration testing to obtain foundation material samples and measure in-situ density. Borehole spacing on the order of 300 to 500 feet is proposed along the new embankment axis.
- Selected HSA borings will be converted to core drilling to enable recovery of bedrock samples and support measurement of in-situ permeability by packer testing.
- Falling head or constant head permeability testing may also be performed in selected borings.
- Shelby tube and split spoon drive ring samples will be collected from selected intervals for analysis of in-situ density, natural moisture content and settlement potential.
- Test pit excavation will be performed in the expansion area to identify potential construction materials outside the previously explored area. Required materials include structural fill for the toe berm and starter dam, liner bedding fill and drain fill.

5.2 Tailings Characterization

NMCC reports that ore processing at Copper Flat will closely follow the process flow sheet developed by Quintana for 1981-82 operations. The characteristics of future tailings will impact operation of the new TSF. There are limited data concerning tailings properties from the Quintana operation, and production records (Oral communication, J. Bailey, 2010) indicate a coarser tailings product was produced during operations than would be predicted based on the pilot study tailings data presented in the original TSF design report (SHB, 1980).

Pilot or bench scale milling and flotation studies are recommended in support of final design studies to determine the physical and geochemical properties of future tailings. The primary objectives of the proposed study include:

- Evaluation of the partitioning of residual sulfides between cyclone underflow and overflow, and assessment of the acid generating and metal leaching potential of both the sand and slimes fractions;
- Determination of the gradation of future whole tailings and the quantity of sand that can be recovered for embankment construction;
- Evaluation of the flow characteristics of the whole tailings slurry;
- Measurement of the shear strength of tailings sand; and
- Measurement of the permeability of tailings sand and slimes under anticipated disposal conditions.

The milling and flotation test work should produce a sufficient quantity of tailings to enable a cyclone simulation to be performed in order to produce samples of both cyclone overflow and underflow. At minimum, the cyclone simulation will require a 55 gallon drum of tailings solids. The sand and slimes fractions produced in the simulation will be sufficient to support a full range of geotechnical and geochemical tests. Tailings should be subjected to the following tests:

- Gradation (sieve and hydrometer), Atterberg Limits, specific gravity (whole tailings, cyclone underflow and overflow);
- Compaction testing (cyclone underflow);
- Slurry consolidation testing (cyclone underflow and overflow);
- Staged triaxial consolidated, undrained shear strength testing with pore pressure measurement (cyclone underflow);
- Air drying (cyclone overflow);
- Shrinkage limit (cyclone overflow); and
- Acid base accounting, net acid generation (NAG), total metals, major oxides by x-ray florescence (XRF), leach extraction testing, and mineralogy by x-ray diffraction (XRD) (cyclone underflow and overflow).

5.3 Hydrogeological Characterization

Local monitoring wells that will be decommissioned during TSF expansion will require replacement in the area below the new toe berm and underdrain collection pond. Water level measurements and in-situ permeability tests conducted concurrently with drilling and well installation can be used in conjunction with existing data to evaluate hydrogeological conditions in the TSF expansion area.

5.4 Climatological Characterization

Estimation of normal precipitation and evaporation rates will be required to develop an impoundment water balance. It is assumed that a climatological model will be developed using a combination of locally collected weather data combined with regional weather records from National Weather Service monitoring stations.

5.5 Engineering Studies

The following is a listing of design studies that will be required to complete the design of the TSF:

- Foundation settlement analyses;
- Tailings drainage analyses;
- Seismic hazard analysis:
- Static and dynamic embankment stability analyses, including estimation of displacement under seismic loading;
- Seismic and static (monotonic loading, flow slide) liquefaction potential analyses;
- Evaluation of tailings sand availability, mass balance and deposition modeling;
- Liner seepage assessment;
- Foundation hydrogeological assessment;
- Water balance;
- Tailings basin hydrologic assessment for surface water diversion sizing;
- Estimation of design storm event (PMP) precipitation;
- Dam breach analysis as per OSE requirements.

6.0 USE OF THIS REPORT

This report has been prepared exclusively for the use of New Mexico Copper Corporation (NMCC) for specific application to the Copper Flat Project. No third party engineer or consultant shall be entitled to rely on any of the information, conclusions, or opinions contained in this report without prior written approval from NMCC or Golder Associates, Inc (Golder).

The conclusions and recommendations in this report have been prepared in a manner consistent with the level of care and skill ordinarily exercised by engineering professionals currently practicing under similar conditions, subject to the time limits and financial and physical constraints imposed on, or otherwise applicable to, Golder's analyses.

In preparing its conclusions and recommendations, Golder has relied upon information provided by the client. Golder is not responsible for errors or omissions in the information provided by NMCC.

GOLDER ASSOCIATES INC.

Eugene Muller, P.E.
Senior Engineer

David A. Kidd, P.E.
Principal, Geotechnical Practice Leader

GM/DAK/br

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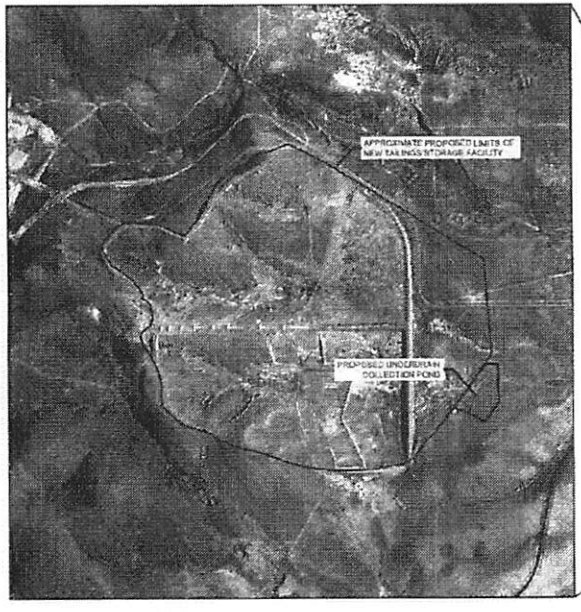
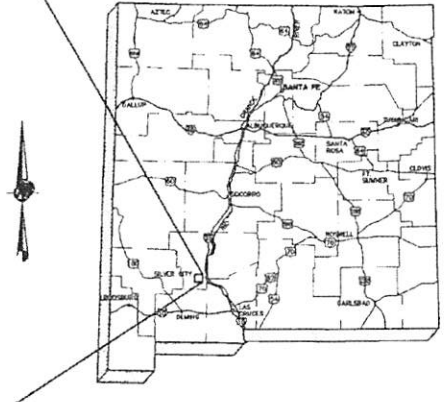
DRAWINGS

COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO



AERIAL PHOTOGRAPH OF PROPOSED TAILINGS DISPOSAL SITE

NOT TO SCALE



STATE OF NEW MEXICO

NOT TO SCALE

LIST OF DRAWINGS

DWG No.	DRAWING TITLE
1	TITLE SHEET
2	GENERAL SITE LAYOUT
3	TAILINGS STORAGE FACILITY PLAN
4	TAILINGS STORAGE FACILITY PLAN AT FINAL BUILD-OUT
5	TAILINGS STORAGE FACILITY CROSS-SECTIONS
6	TAILINGS STORAGE FACILITY UNDERDRAIN PLAN
7	TAILINGS STORAGE FACILITY DETAILS
8	TAILINGS STORAGE FACILITY HEIGHT VS CAPACITY PLOT
9	TAILINGS STORAGE FACILITY CONCEPTUAL CLOSURE PLAN

GENERAL NOTES

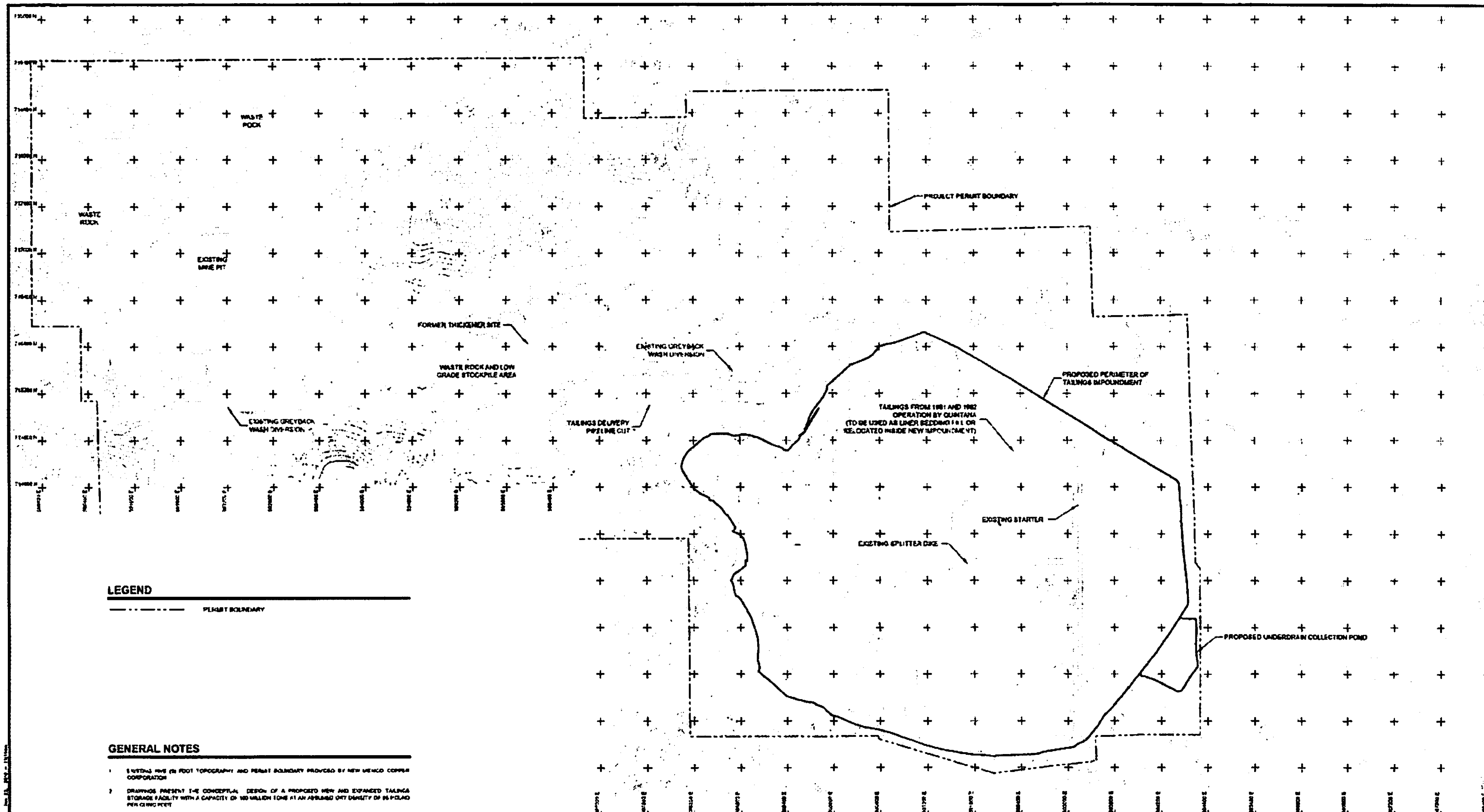
1. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
2. AERIAL PHOTOGRAPHY IS GOOGLE 2010, NMRGIS 2010.
3. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A PROPOSED NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT.
4. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD).
5. AERIAL PHOTOGRAPH SHOWS EXISTING TAILINGS DISPOSAL AREA DISTURBANCE FROM MINING, MILLING AND TAILINGS DISPOSAL OPERATIONS CONDUCTED BY QUINTANA RESOURCES IN 1981-82.
6. EXISTING TAILINGS FROM THE QUINTANA 1981-82 OPERATIONS ARE THE SUBJECT OF AN ONGOING ABATEMENT ACTION. THE CONCEPTUAL DESIGN CONSIDERS CAPPING EXISTING TAILINGS BENEATH THE FUTURE IMPOUNDMENT LINER SYSTEM THROUGH THEIR INCORPORATION IN THE LINER BEDDING FILL LAYER. OR PLACEMENT OF EXISTING TAILINGS ON THE NEW IMPOUNDMENT LINER. ALTERNATIVES FOR MANAGEMENT OF EXISTING TAILINGS WILL BE DEVELOPED IN CONSULTATION WITH NMED.

DAVID ALAN KIDD
NEW MEXICO
13778
REGISTERED PROFESSIONAL ENGINEER
11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION	PROJECT: COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
	TITLE: TITLE SHEET

Golder Associates

PROJECT No.		103-92557	FILE No.		1039255700
DESIGN	CAJ	10/25/10	SCALE	AS SHOWN	REV. C
CADD	ANV	10/27/10	DRAWING	1	
CHECK	DM	10/28/10			
REVIEW	SAC	11/17/10			



LEGEND

—·—·— PERMIT BOUNDARY

GENERAL NOTES

1. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION
2. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A PROPOSED NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 95 POUND PER CUBIC FOOT
3. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (MMD)
4. TOPOGRAPHY IN THE MINE AREA AND TAILINGS STORAGE FACILITY REPRESENTS EXISTING CONDITIONS AND DISTURBANCE ASSOCIATED WITH QUINTANA 1981-82 MINING OPERATIONS
5. PROPOSED TAILINGS STORAGE FACILITY FOOTPRINT IS FOR A NEW FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 95 POUND PER CUBIC FOOT

SCALE 600 0 600 1200 FEET

DAVID ALAN KIRK
NEW MEXICO
13778
REGISTERED PROFESSIONAL ENGINEER
11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

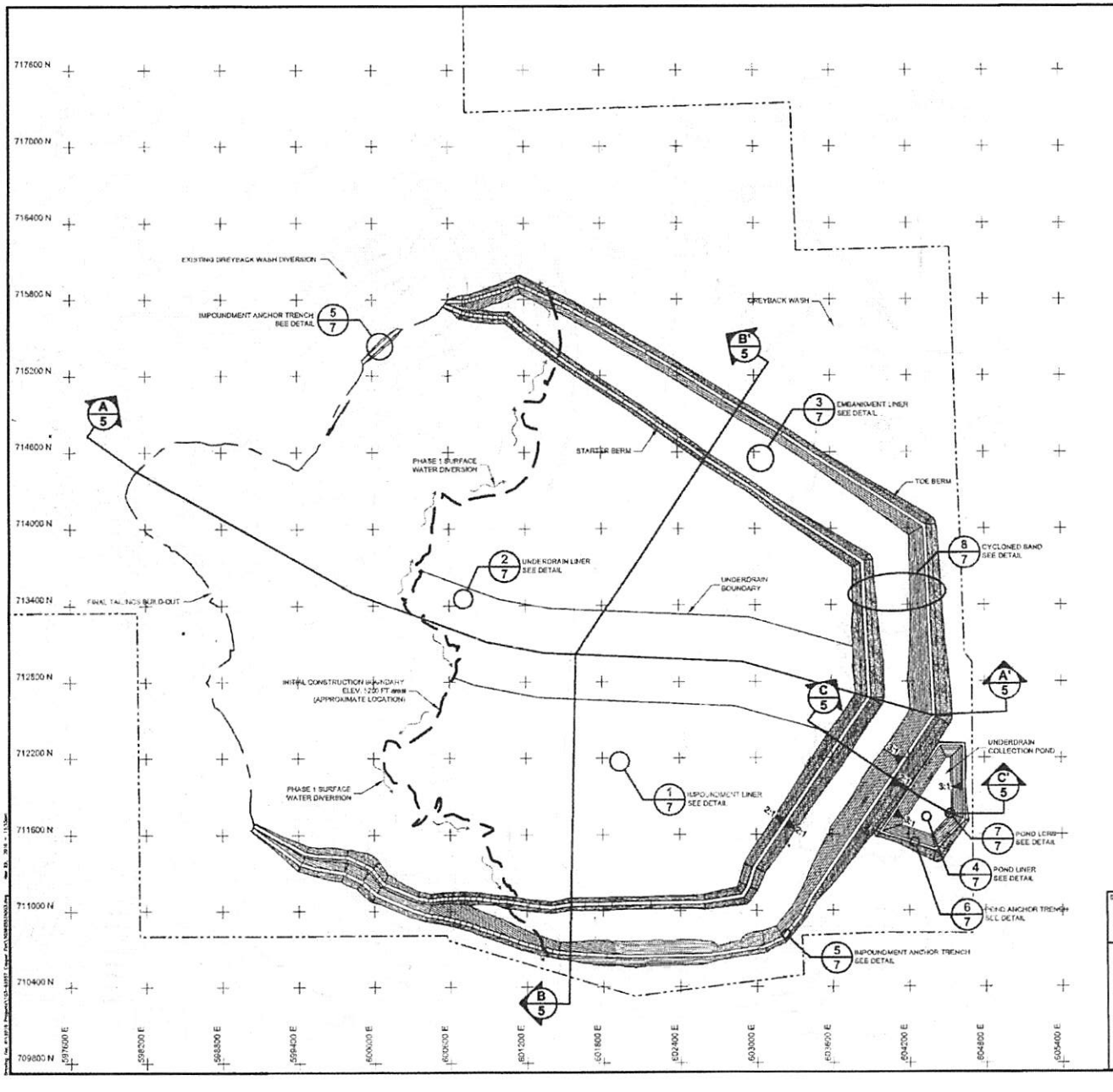
PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE:

GENERAL SITE LAYOUT

Golder Associates

PROJECT No.		103-82557	FILE No. 10382557A002	
DESIGN	CDJ	10/23/10	SCALE AS SHOWN	REV. 0
CADD	ANV	10/27/10	DRAWING	
CHECK	GM	10/28/10	2	
REVIEW	DAK	11/17/10		



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PHASE 1 SURFACE WATER DIVERSION FLOW ARROW
- PERMIT BOUNDARY
- INITIAL CONSTRUCTION BOUNDARY
- FINAL TAILINGS BUILD-OUT
- 3/7 DETAIL CALL-OUT
- A/5 CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NMMMD).
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
4. TOPOGRAPHY IN THE VICINITY OF THE QUINTANA STARTER DAM AND TAILINGS CELLS APPROXIMATED BY GOLDER TO REPRESENT PRE-CONSTRUCTION TOPOGRAPHY FOLLOWING DEMOLITION (SCARROW) OF THE EXISTING STARTER EMBANKMENT, RELOCATION OF EXISTING TAILINGS AND REGRADING IN FORMER BORROW AREAS AND EXISTING DISTURBANCE AREAS. TOPOGRAPHY IN OTHER LOCATIONS REPRESENTS EXISTING CONDITIONS. A SITE WIDE TAILINGS DISPOSAL FACILITY GRADING PLAN WILL BE DEVELOPED IN FUTURE DESIGN STUDIES.
5. EXISTING TAILINGS FROM THE QUINTANA 1981-82 OPERATIONS ARE THE SUBJECT OF AN ONGOING ABATEMENT ACTION. THE CONCEPTUAL DESIGN CONSIDERS CAPPING EXISTING TAILINGS BENEATH THE FUTURE IMPOUNDMENT LINER SYSTEM THROUGH THEIR INCORPORATION IN THE LINER BEDDING FILL LAYER, OR PLACEMENT OF EXISTING TAILINGS ON THE NEW IMPOUNDMENT LINER. ALTERNATIVES FOR MANAGEMENT OF EXISTING TAILINGS WILL BE DEVELOPED IN CONSULTATION WITH NMED.
6. PHASE 1 CONSTRUCTION LIMITS ARE APPROXIMATELY LOCATED. PHASE 1 AND SUBSEQUENT CONSTRUCTION PHASE LIMITS AND SURFACE WATER DIVERSION REQUIREMENTS WILL BE DETERMINED IN FUTURE ENGINEERING DESIGN STUDIES.
7. EMBANKMENT RAISES WILL BE CONSTRUCTED BY THE CENTERLINE RAISE METHOD USING CYCLONE UNDERFLOW (TAILINGS SAND). CYCLONE OVERFLOW (SLIMES) WILL BE DISCHARGED INTO THE INTERIOR OF THE TAILINGS STORAGE FACILITY.
8. DURING OPERATION, STORMWATER WILL BE CONTAINED WITHIN THE TAILINGS STORAGE FACILITY AND UTILIZED AS PROCESS MAKE-UP WATER. A PROJECT WATER BALANCE WILL BE DEVELOPED IN FUTURE ENGINEERING DESIGN STUDIES.

DAVID ALAN KIDD
NEW MEXICO
13778
11-17-10
REGISTERED PROFESSIONAL ENGINEER

400 0 400 800
SCALE FEET

DRAWING USE
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

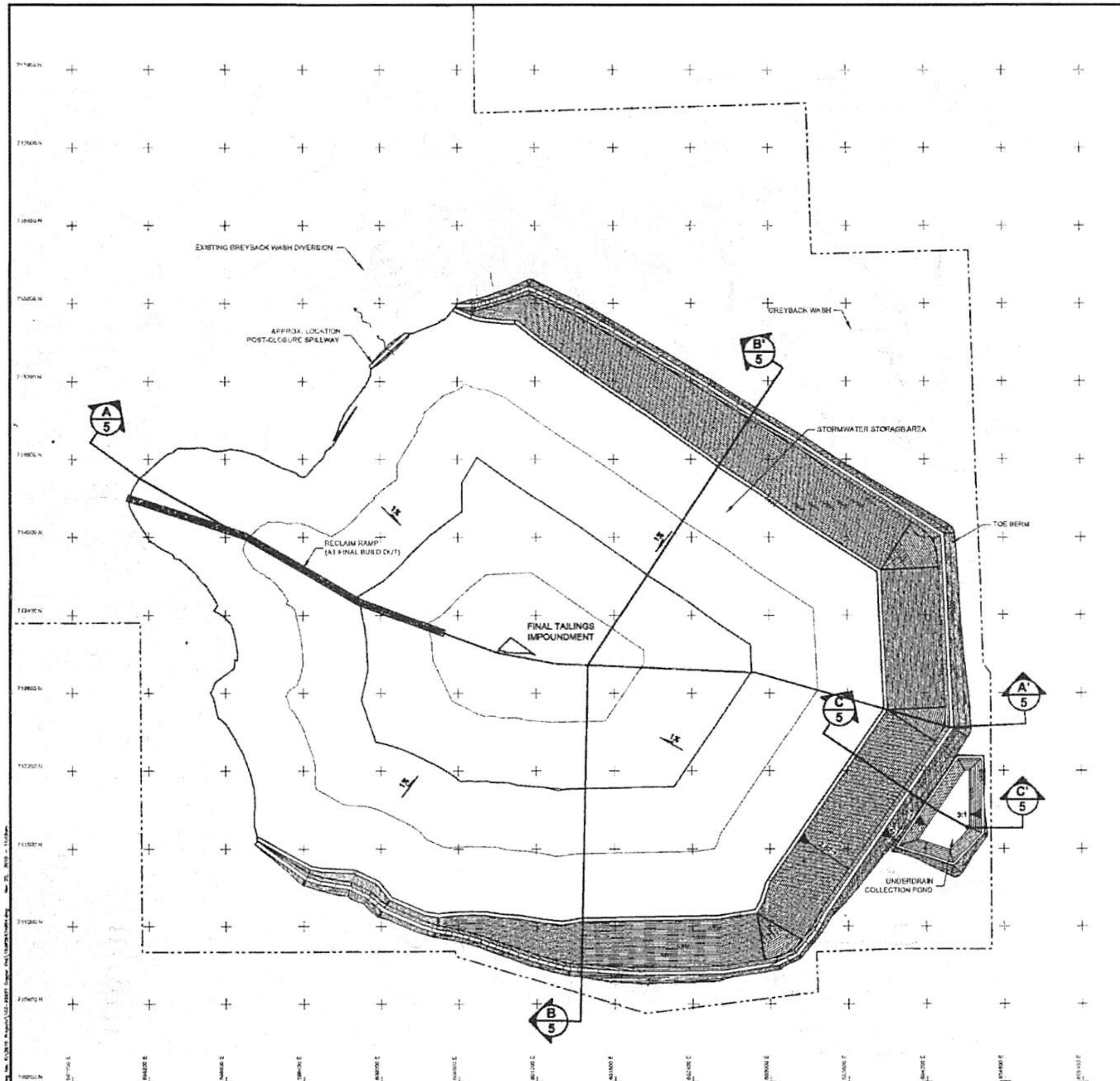
PROJECT
COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE
TAILINGS STORAGE FACILITY PLAN

Golder Associates

PROJECT No.	103-92557	FILE No.	10392557A003		
DESIGN	CDJ	10/25/10	SCALE	AS SHOWN	REV. 0
CADD	ARV	10/27/10	DRAWING		
CHECK	GM	10/29/10		3	
REVIEW	DAK	11/17/10			

19371



LEGEND

EXISTING CONTOURS

DESIGN CONTOURS

PERMIT BOUNDARY

CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 85 POUND PER CUBIC FOOT
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD)
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION
4. FINAL EMBANKMENT CREST HEIGHT WILL BE APPROXIMATELY 5,375 FEET AMSL. TAILINGS SURFACE CONFIGURATION SHOWN REPRESENTS CONDITIONS AT THE CESSATION OF MINING OPERATIONS. APPROXIMATE LOCATION OF A POST-CLOSURE SPILLWAY SHOWN. TAILINGS DISCHARGE LOCATIONS MAY BE MODIFIED IN LATE STAGE OPERATIONS TO GRADE THE IMPOUNDMENT SURFACE AND FACILITATE POST-CLOSURE DRAINAGE TO THE PERMANENT SPILLWAY.
5. SELECTION OF A DESIGN STORM EVENT FOR STORMWATER STORAGE AND SPILLWAY CAPACITY WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW MEXICO STATE ENGINEER

DAVID ALAN KIDD
NEW MEXICO
13778
11-17-10
REGISTERED PROFESSIONAL ENGINEER

SCALE 400 0 400 800 FEET

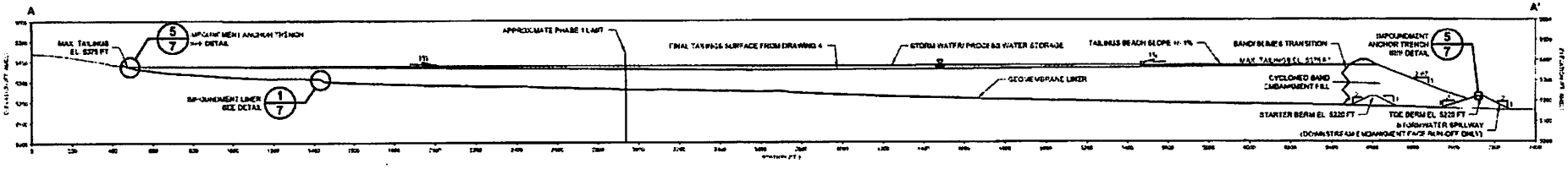
DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

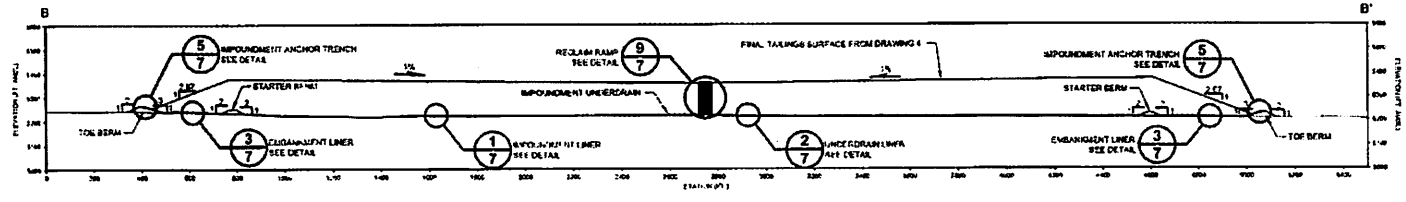
TITLE:
TAILINGS STORAGE FACILITY AT FINAL BUILD-OUT

Golder Associates

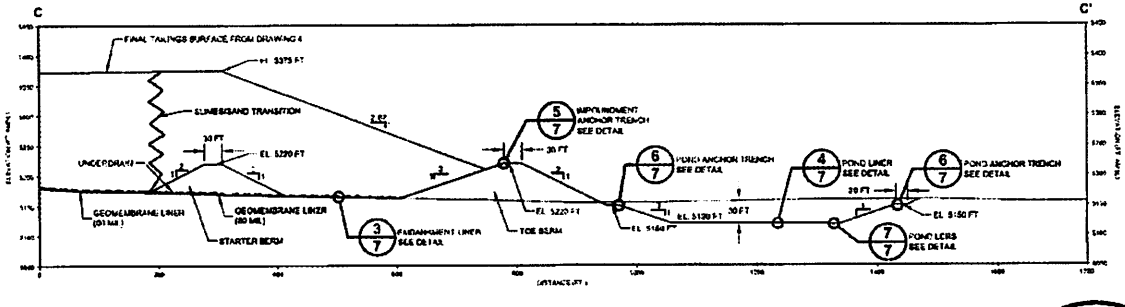
PROJECT No.	103-92557		FILE No.	10392557A004
DESIGN	CDJ	10/25/10	SCALE AS SHOWN	REV. C
CADD	ANV	10/27/10	DRAWING	4
CHECK	GM	10/29/10		
REVIEW	DAK	11/17/10		



A/5 CROSS SECTION A-A'



B/5 CROSS SECTION B-B'



C/5 CROSS SECTION C-C'

DAVID ALAN KIRD NEW MEXICO 13778 REGISTERED PROFESSIONAL ENGINEER 11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

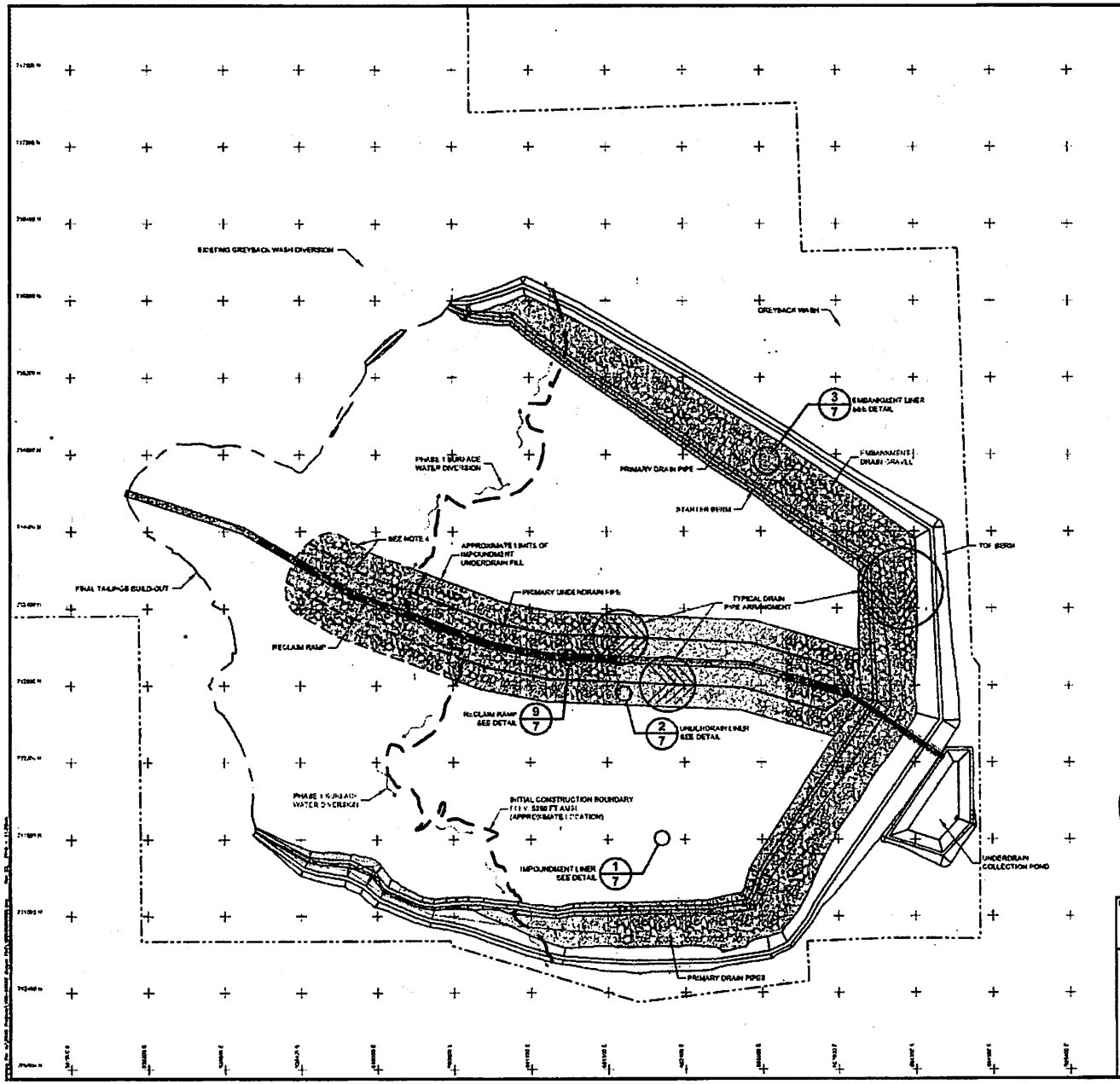
PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE: **TAILING FACILITY STORAGE CROSS-SECTIONS**

Golder Associates

PROJECT No.		103-82557	FILE No.		103825574000
DESIGN	CSJ	10/25/10	SCALE	AS SHOWN	REV. C
DRCD	AMW	10/27/10	DRAWING		
CHECK	GM	10/28/10		5	
REVIEW	CMC	11/17/10			

19373



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PHASE 1 SURFACE WATER DIVERSION FLOW ARROW
- PERMIT BOUNDARY
- PHASE 1 BOUNDARY
- FINAL TAILINGS BUILD-OUT
- PRIMARY UNDERDRAIN PIPE
- PRIMARY DRAIN PIPE
- UNDERDRAIN FILL
- 3/7 DETAIL CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 80 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NM MMD)
3. EXISTING 5 FOOT (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION
4. APPROXIMATE LIMITS OF UNDER DRAIN SYSTEM SHOWN. EMBANKMENT UNDERDRAIN WILL BE A GRADED SAND AND GRAVEL DRAIN THAT IS FILTER COMPATIBLE WITH CYCLONED TAILINGS SAND. IMPOUNDMENT UNDER DRAIN WILL BE GEOTEXTILE FABRIC WRAPPED. THE IMPOUNDMENT UNDERDRAIN WILL BE EXTENDED DURING PHASED CONSTRUCTION

DAVID ALAN KIRBY NEW MEXICO 13778 REGISTERED PROFESSIONAL ENGINEER 11-17-10

SCALE 400 0 400 800 FEET

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION

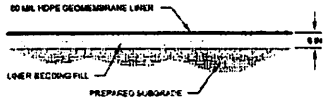
PROJECT: COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE: **TAILINGS STORAGE FACILITY UNDERDRAIN PLAN**

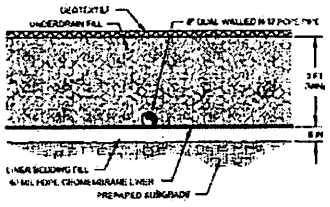
Golder Associates

PROJECT No.	103-93337	FILE No.	10383337A006	
DESIGN	CDJ	10/25/10	SCALE AS SHOWN	REV. 0
CADD	AMV	10/27/10	DRAWING 6	
CHECK	CJH	10/28/10		
REVIEW	DAK	11/17/10		

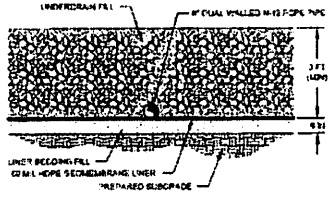
19374



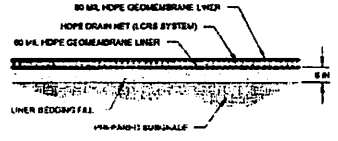
1/7 IMPOUNDMENT LINER DETAIL
NOT TO SCALE



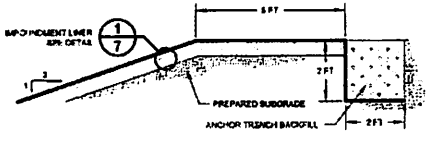
2/7 UNDERDRAIN AREA LINER DETAIL
NOT TO SCALE



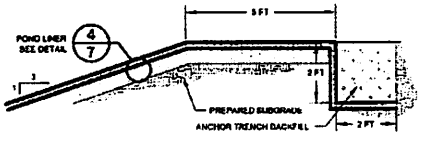
3/7 EMBANKMENT AREA LINER DETAIL
NOT TO SCALE



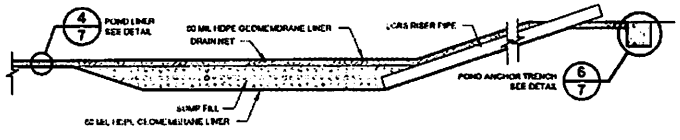
4/7 POND LINER DETAIL
NOT TO SCALE



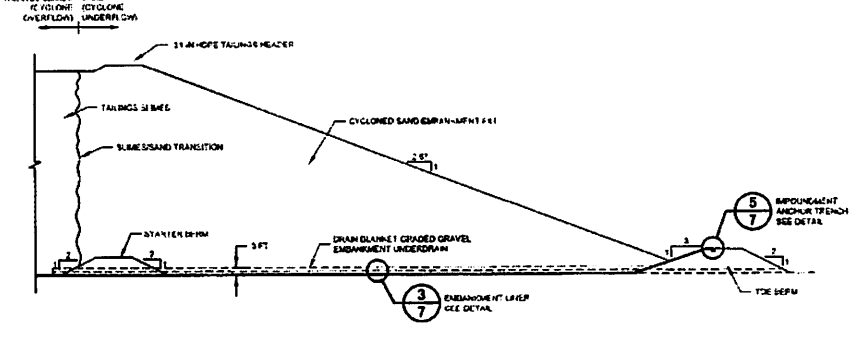
5/7 IMPOUNDMENT ANCHOR TRENCH DETAIL
NOT TO SCALE



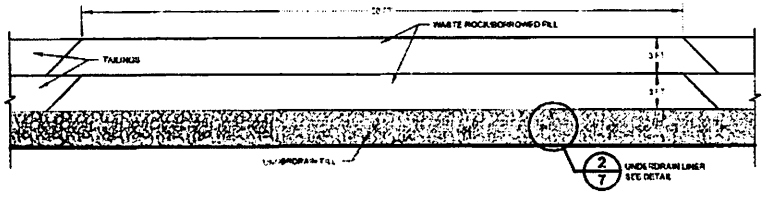
6/7 POND ANCHOR TRENCH DETAIL
NOT TO SCALE



7/7 POND LEAK COLLECTION AND RECOVERY SYSTEM (LCRS) DETAIL
NOT TO SCALE



8/7 CYCLONED SAND EMBANKMENT DETAIL
NOT TO SCALE



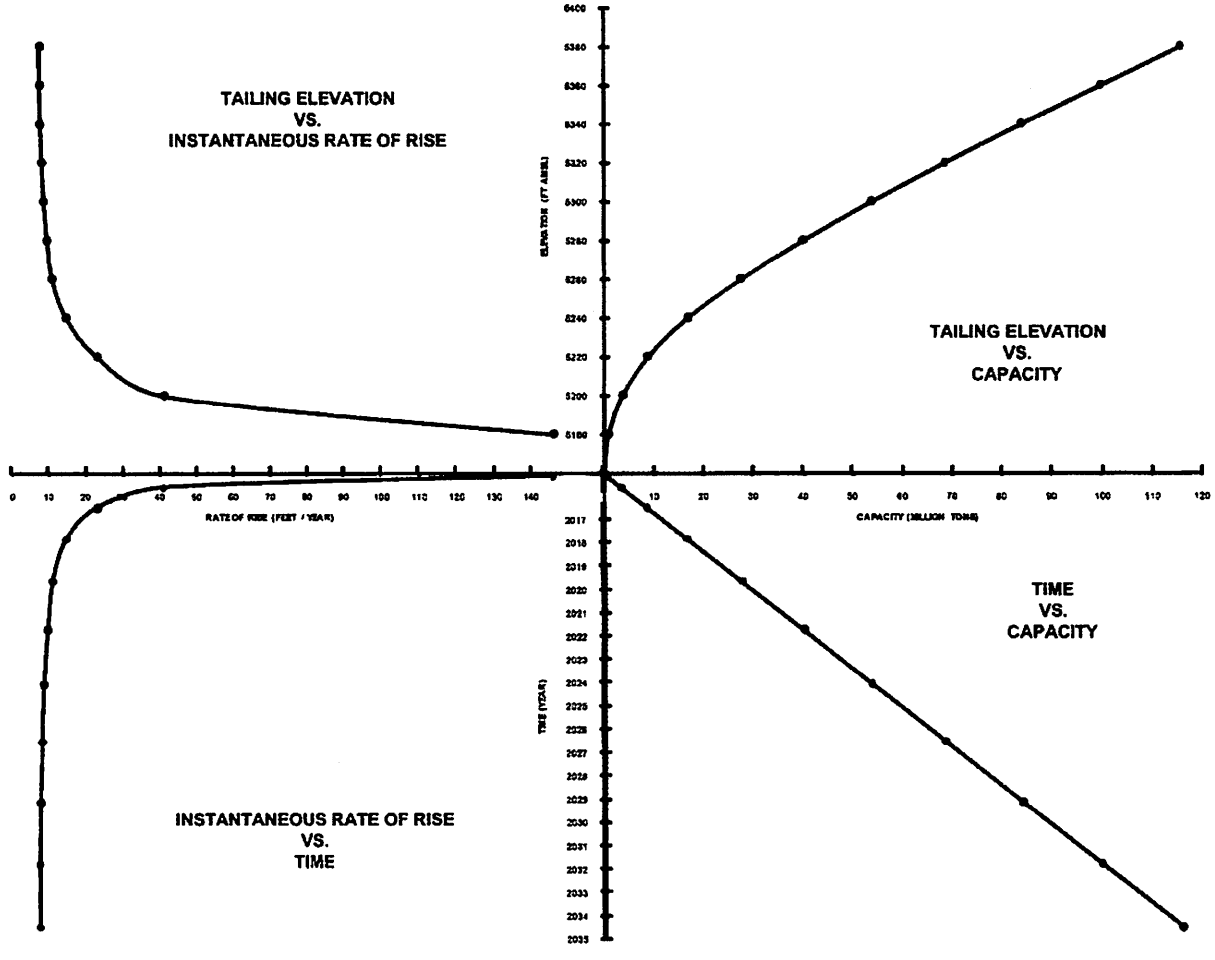
9/7 PROCESS WATER RECLAIM RAMP DETAIL
NOT TO SCALE

DAVID ALAN KIDD
NEW MEXICO
13778
REGISTERED PROFESSIONAL ENGINEER
11-17-10

DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION	PROJECT: COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
	TITLE: TAILINGS STORAGE FACILITY DETAILS

Golder Associates

PROJECT No.	103-92307	FILE No.	1039253740007		
DESIGN	CDJ	10/25/10	SCALE	AS SHOWN	REV. C
CADD	ANV	10/27/10	DRAWING	7	
CHECK	CN	10/29/10			
REVIEW	DAK	11/17/10			



NOTES

1. CAPACITY ESTIMATED USING EXISTING FIVE (5) FOOT TOPOGRAPHY PROVIDED BY NEW MEXICO COPPER CORPORATION AND A DRY DENSITY OF 85 PCF
2. TAILING MAXIMUM ELEVATION IS 5,375 FT AMSL AT LOCATION OF DISCHARGE POINT.
3. RATE OF RISE IS CALCULATED FROM THE PRODUCTION RATE OF 17,500 TONS PER DAY AT 91% AVAILABILITY FOR AN ANNUAL PRODUCTION OF 5,840,375 TONS
4. ASSUMED START-UP DATE 2013. ACTUAL START DATE TO BE DETERMINED

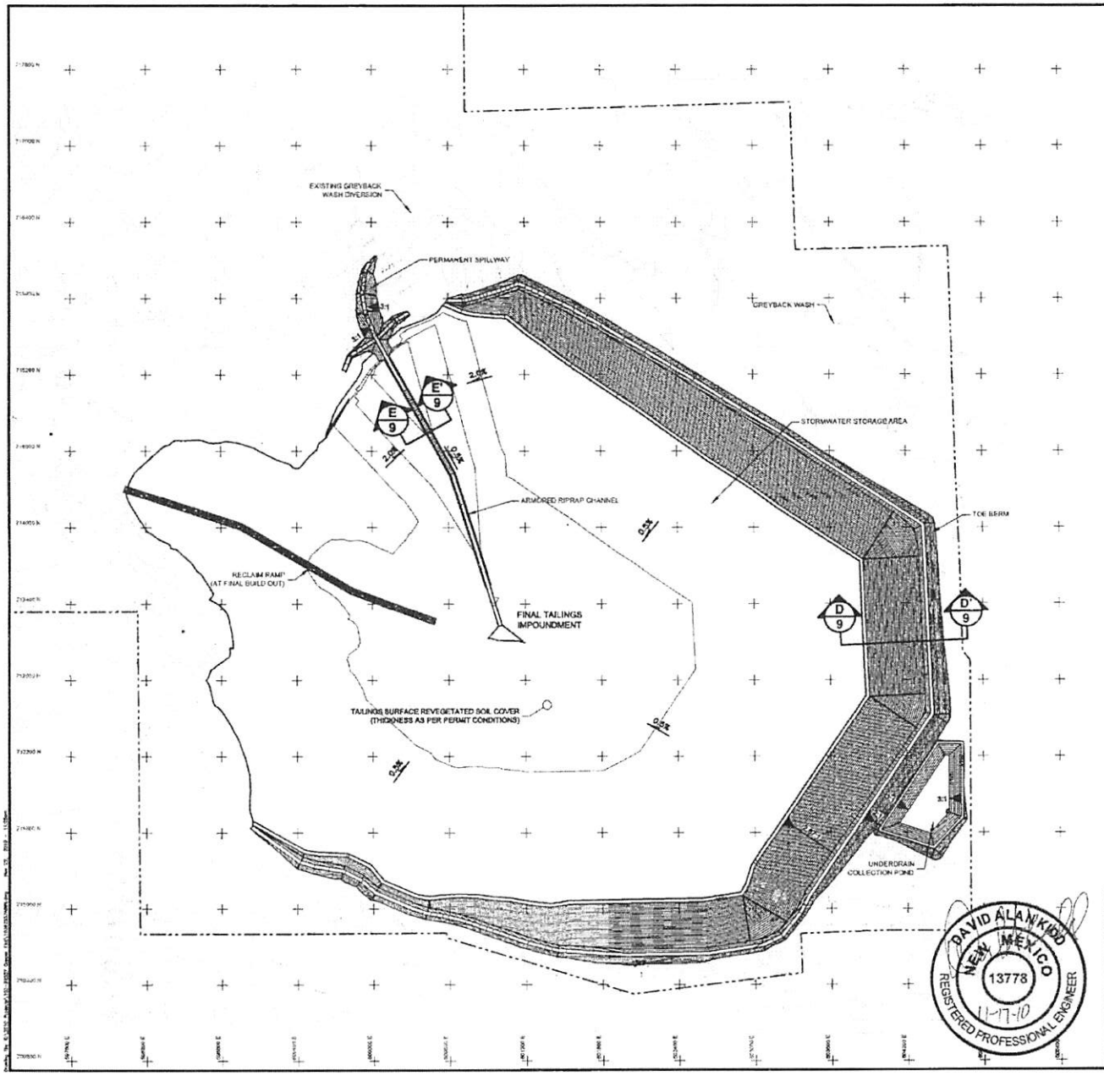
DAVID ALAN KIDD
NEW MEXICO
13778
11-17-10
REGISTERED PROFESSIONAL ENGINEER

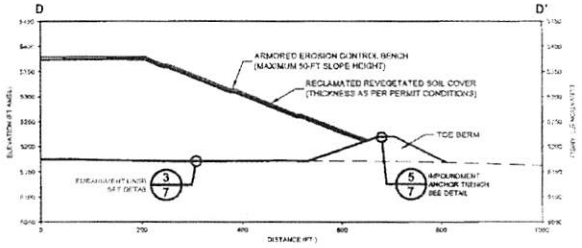
DRAWING USE: CONCEPTUAL DESIGN NOT FOR CONSTRUCTION	PROJECT: COPPER FLAT PROJECT TAILINGS STORAGE FACILITY CONCEPTUAL DESIGN STUDY SIERRA COUNTY, NEW MEXICO
	TITLE: **HEIGHT VS. CAPACITY PLOT**

Golder Associates

PROJECT No.		103-92357	FILE No.	10392357AC08
DESIGN	CDJ	10/25/10	SCALE	N.T.S. REV. C
CADD	ANN	10/27/10	DRAWING	8
CHECK	GM	10/28/10		
REVIEW	DAK	11/17/10		

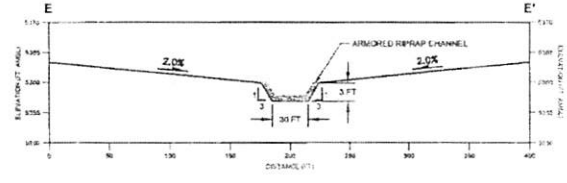
19376





D/9 CROSS SECTION D-D'

SCALE 120 0 120 240 FEET



E/9 CROSS SECTION E-E'

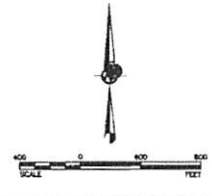
SCALE (x5 VERTICAL EXAGGERATION) 50 0 50 100 FEET

LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- PERMIT BOUNDARY
- D/9 CROSS-SECTION CALL-OUT

NOTES

1. DRAWINGS PRESENT THE CONCEPTUAL DESIGN OF A NEW AND EXPANDED TAILINGS STORAGE FACILITY WITH A CAPACITY OF 100 MILLION TONS AT AN ASSUMED DRY DENSITY OF 95 POUND PER CUBIC FOOT.
2. FINAL DESIGN WILL BE COMPLETED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE NEW MEXICO STATE ENGINEER, THE NEW MEXICO ENVIRONMENT DEPARTMENT (NMED) AND THE NEW MEXICO MINING AND MINERALS DIVISION (NMMMD).
3. EXISTING FIVE (5) FOOT TOPOGRAPHY AND PERMIT BOUNDARY PROVIDED BY NEW MEXICO COPPER CORPORATION.
4. FINAL EMBANKMENT CREST HEIGHT WILL BE APPROXIMATELY 5,375 FEET AMSL. TAILINGS SURFACE CONFIGURATION SHOWN REPRESENTS CONDITIONS AT THE CESSATION OF MINING OPERATIONS. APPROXIMATE LOCATION OF A POST-CLOSURE SPILLWAY SHOWN. TAILINGS DISCHARGE LOCATIONS MAY BE MODIFIED IN LATE STAGE OPERATIONS TO GRADE THE IMPOUNDMENT SURFACE AND FACILITATE POST-CLOSURE DRAINAGE TO THE PERMANENT SPILLWAY.
5. SELECTION OF A DESIGN STORM EVENT FOR STORMWATER STORAGE AND SPILLWAY CAPACITY WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW MEXICO STATE ENGINEER.
6. TAILINGS SURFACE REGRADED AT CLOSURE OR TAILINGS DEPOSITION PATTERNS MODIFIED DURING LATE STAGE OPERATION TO CONTOUR THE TAILINGS SURFACE.
7. UNDERDRAINING TO BE COLLECTED AND EVAPORATED ON IMPOUNDMENT SURFACE UNTIL UNDERDRAIN PIPES CAN BE PLUGGED AND UNDERDRAIN COLLECTION POND BACKFILLED.



DRAWING USE
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

PROJECT
COPPER FLAT PROJECT
TAILINGS STORAGE FACILITY
CONCEPTUAL DESIGN STUDY
SIERRA COUNTY, NEW MEXICO

TITLE
TAILINGS STORAGE FACILITY CONCEPTUAL CLOSURE PLAN

Golder Associates

PROJECT No.	103-92557		FILE No.	10392557A009
DESIGN	CDJ	10/25/10	SCALE	AS SHOWN REV. 0
CADD	ANV	10/27/10	DRAWING	9
CHECK	GM	10/29/10		
REVIEW	DAK	11/17/10		

THE NOTEBOOK

Hearing Officer

I want to THANK New Mexico Environmental Dept FOR HEARING THE CONCERNS OF THE PUBLIC

I am indeed sincerely & seriously concerned about the OVERWHELMING possibility of environmental pollution if this COPPER mine is allowed to open

I want the New Mexico Environmental Department (NMED) **TO NOT GRANT THIS PERMIT FOR DISCHARGE OF WASTEWATER**
UNLESS

New Mexico Environmental Department is **120%** sure that this mining company
THEMAC (financed out of Australia) called New Mexico Copper Company ***set up*** in Canada,

HAVE PROVEN WITH DETAILED DOCUMENTATION beyond a doubt
THAT THEY INTEND TO
PROTECT OUR SIERRA COUNTY ENVIRONMENT
FROM ANY WASTE WATER CONTAMINATION,

And they Will take every possible precaution
to protect our fragile desert environment
which is stressed to the max right now with serious drought conditions

I've brought to this Public Hearing my **research**
which I began in 2011 and have been doing continuously until now.

Some of MY RESEARCH is included inside this notebook that I will hand in following my comments ASKING THAT MY WRITTEN COMMENTS BE ADDED TO THE PUBLIC RECORD OF THIS HEARING.

MY COMMENTS are focused on the heavy duty plastic liner called an HDPE GEOMEMBRANE liner WHICH WILL BE LAID OUT ON THE GROUND OF THE 547 ACRE TAILINGS STORAGE FACILITY – COMMONLY CALLED 'THE TAILINGS POND' WHICH IS DESIGNED TO HOLD 100 MILLION TONS OF ROCK THAT CAN GENERATE ACID MINE DRAINAGE.

Disappointed to see no explanation for CQA how they plan to ~~PP~~ implement liner

(here I will Name the documents)
NMCC Mining Plan of Operation,
Appendix D: Tailings Impoundment Conceptual Design Report (Golder, 2010),
Golder Associates Inc, November 17, 2010, COPPER FLAT PROJECT Conceptual Design Report, 103-92557.

→ **Geotechnical Construction Quality Assurance (CQA) Plan for Construction of the Composite Liner System at Gregory Canyon Landfill ; Prepared for: Bryan A. Stirrat & Associates**

***United States Environmental Protection Agency Guide for Industrial Waste, Part IV, Protecting Ground Water, Chapter 7: Section B, Designing and Installing Liners: Technical Considerations for New Surface Impoundments, Landfills, and Waste Piles**

NEW MEXICO COPPER RULE
TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 7 GROUND WATER PROTECTION - SUPPLEMENTAL PERMITTING REQUIREMENTS FOR COPPER MINE FACILITIES

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS
Riva Nortje MScEng (Civil) PrEng Associat Waste & Tailings; Jones & Wagener, Engineering & Environmental Consultants,

I WANT ALL OF US TO BE PROUD OF OUR NEW MEXICO ENVIRONMENTAL DEPARTMENT & OTHERS WHO ARE INVOLVED

****

I wanted to make it **easy** for NMED to find this notebook
and I want to provide the **NEW MEXICO ENVIRONMENTAL DEPARTMENT**
with **a few simple symbolic reminders**
that the NMED is **responsible for** protecting & guarding
our New Mexico
AIR, WATER EARTH, WILDLIFE and PLANTS.

MADAM HEARING OFFICER

So, you – our **NEW MEXICO ENVIRONMENTAL DEPARTMENT**
have been designated
– OUR GUARDIAN **BEAR**

Please keep in mind the adage: An ounce of PREVENTION is worth a POUND of cure.
Thank you for hearing my comments and for your sincere and knowledgeable attention to the details of this PERMIT.
Please make a fully informed and cautious decision.

I believe the method/formula used in the Shomaker ..._____
may be outdated and newer formulas may give a more accurate data on any projected theoretical amount of leakage from rips, tears, punctures, perforations of the HDPE Liner. See methods/formulas in doc _____

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of Southern Africa

ESTIMATING LEAKAGE RATES THROUGH BARRIER SYSTEMS

Riva Nortjé MScEng (Civil) PrEng
Associate, Waste & Tailings

Jones & Wagener
Engineering & Environmental Consultants

Keep in Mind…

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There are known knowns. These are things we know that we know.

There are known unknowns. That is to say, there are things that we know we don't know.

But there are also unknown unknowns. There are things we don't know we don't know.

Donald Rumsfeld

2

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What is liner leakage?

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- Flow that occurs through a lining system.
- No leakage is a great objective, but is not usually realistically achievable.

Why are leakage rates important?

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Leakage rates are:

- Used in groundwater models undertaken for risk assessments/ analyses to determine possible and likely impacts from new facilities.
- Used in groundwater models to determine likely impact of possible mitigation measures for existing and for new facilities.
- Used to design drainage elements.

Monitoring and interpreting leakage rates can indicate when a problem has occurred and this can be mitigated before it impacts the environment significantly.

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Grasping Leakage Rates

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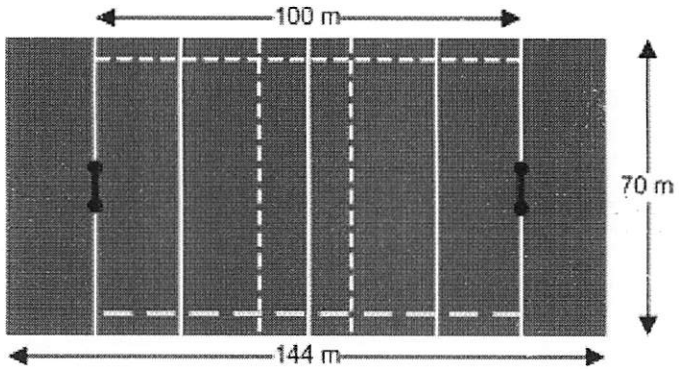
How big is a hectare?

Rugby (International size: 1.008 ha)



How much does a bucket hold?

10 litres

Leakage rate of 10 litres per hectare per day is equivalent to emptying a bucket of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Grasping Leakage Rates

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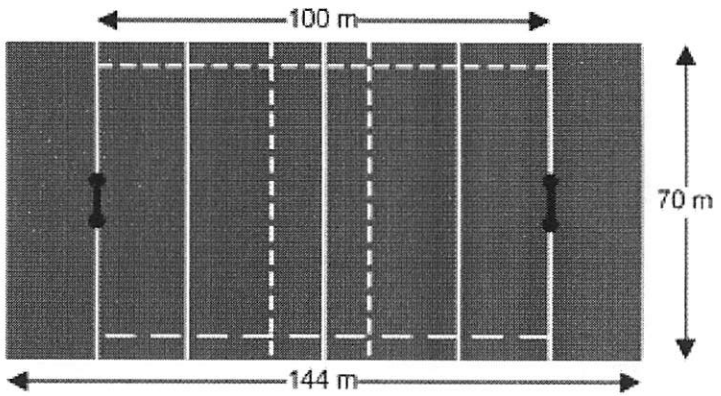
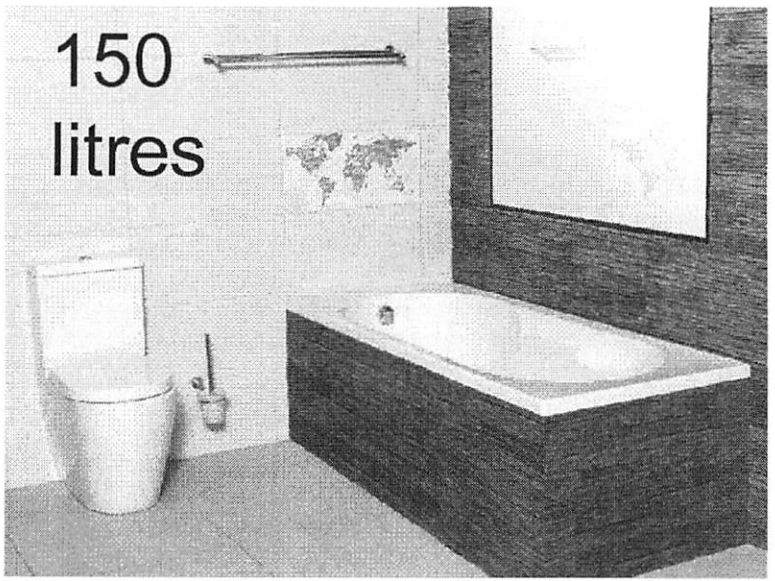
How big is a hectare?

Rugby (International size: 1.008 ha)



How many litres does a bath hold?



Leakage rate of 150 litres per hectare per day is equivalent to emptying a bath full of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Grasping Leakage Rates

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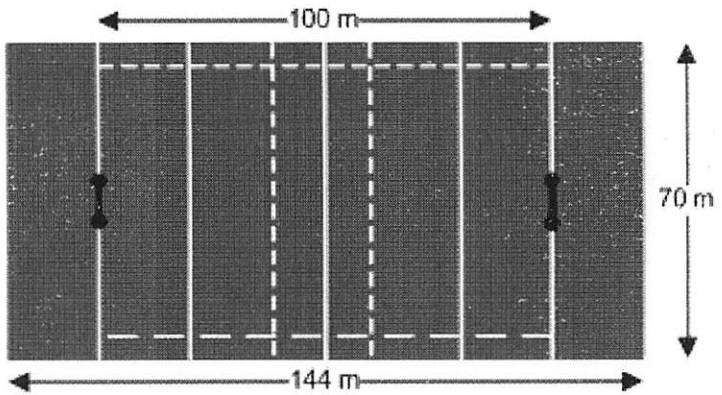
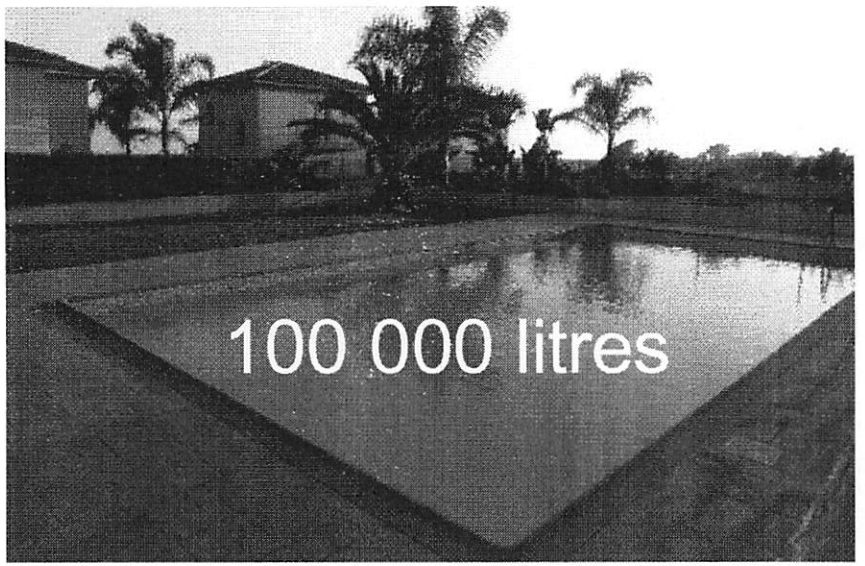
How big is a hectare?

Rugby (International size: 1.008 ha)



How many litres does a big pool hold?



Leakage rate of 100 000 litres per hectare per day is equivalent to emptying a big pool full of ~~water~~ contaminated liquids over a rugby field every 24 hours.

Barrier Systems: Norms and Standards (2013)

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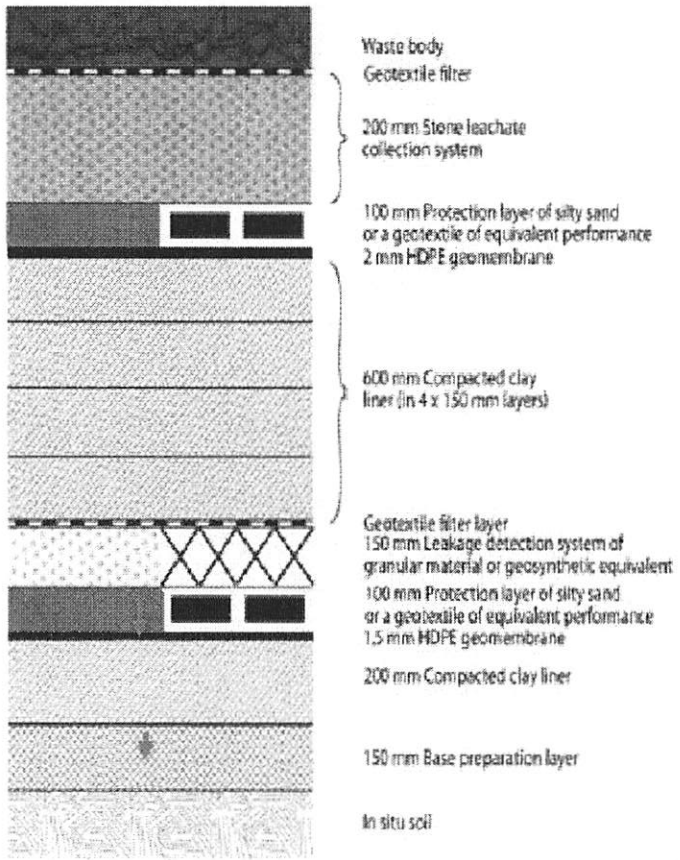
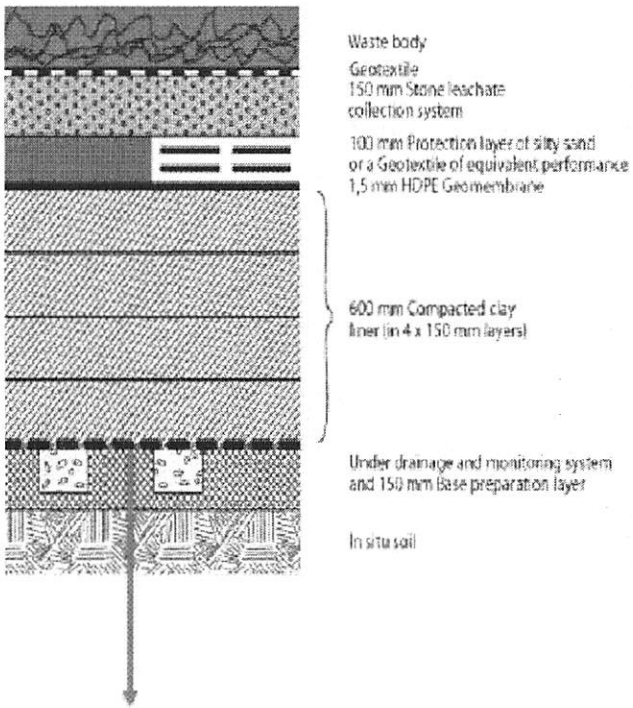
Class A landfill for disposal of Type 1 Wastes



Class B landfill for disposal of Type 2 Wastes



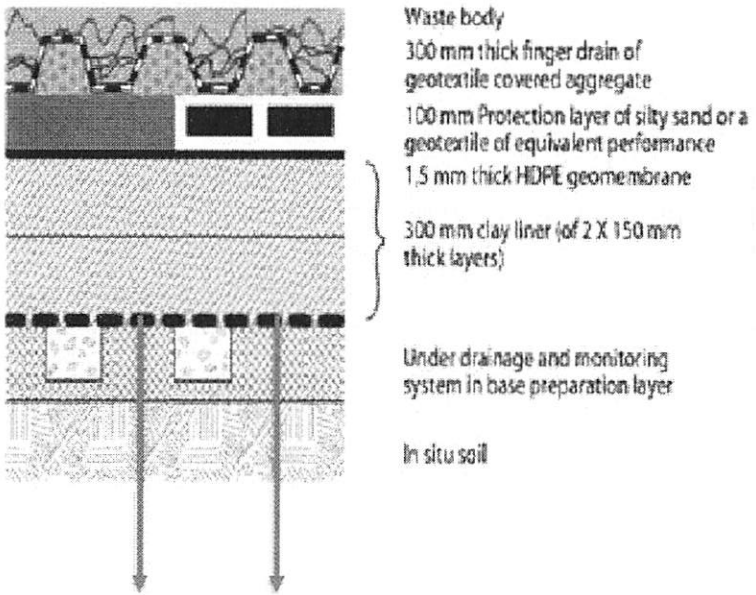
Department of Environmental Affairs, 2013. National Norms and Standards for Disposal of Waste to Landfill, No. R. 636, Government Gazette No. 36784.

JONES & WAGENER 50 ESTABLISHED 1966

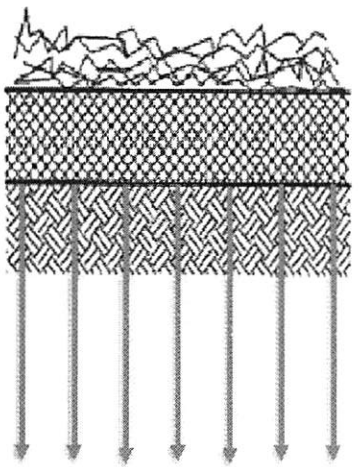
Barrier Systems: Norms and Standards (2013)

Institute of Waste Management of Southern Africa

Class C landfill for disposal of Type 3 Wastes



Class D landfill for disposal of Type 4 Wastes



Department of Environmental Affairs, 2013. National Norms and Standards for Disposal of Waste to Landfill, No. R. 636, Government Gazette No. 36784.

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HOW NOT TO ESTIMATE LEAKAGE RATES

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1. Obtain facility information

2. Undertake minimal liner design

3A. Calculate likely range of leakage for minimum liner design from old literature, don't consider chemical compatibility, assume materials, construction etc will be ideal etc

3B. OR Pull out some composite liner leakage rates from overseas literature, where design and CQA requirements are strict

4. Use the low leakage rates chosen in the *RISK ANALYSIS* without stating assumptions

5. Get approval and file it

6. Don't include assumptions made regarding materials, construction, protection, operation and rehabilitation into subsequent documentation (design, tenders, construction quality plans, operating manuals etc)

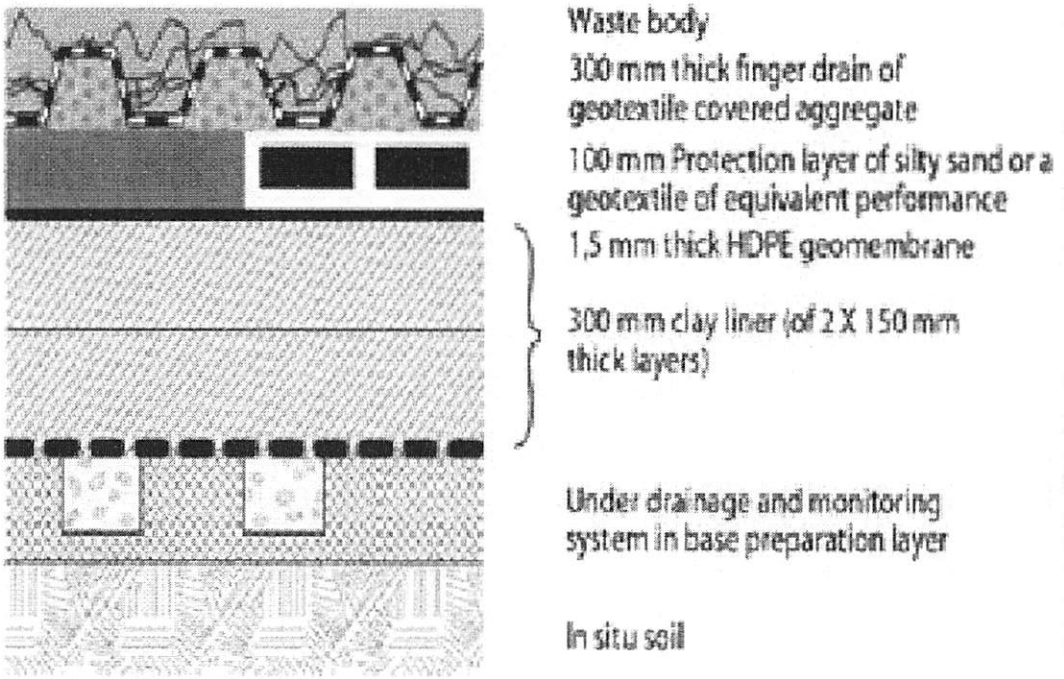
7. Don't appoint specialists to construct liners

8. Don't undertake construction quality assurance

9. Don't monitor leakage rates nor compare with assumptions used in *RISK ANALYSIS*

Theoretical Example 1

- Large, wet tailings facility proposed.
- Assume a Class C liner from the National Norms and Standards:



Theoretical Example 1

- That's a composite liner, and we'll get good contact between the geomembrane and the clay, with maybe only a few small holes, and our finger drains will keep the liquid height on top of the liner at not more than 300mm, right?
- Pull leakage rates from Giroud (1989):

Table 1 - Generalized Leakage Rates Through Liners
(ref. Giroud and Bonaparte, Jour. G & G, 1989)

Type of Liner	Leakage Mechanism	Liquid height on top of the geomembrane			
		0.03 m	0.3 m	3 m	30 m
Geomembrane alone (between two sand layers)	Diffusion	0.01	1	10	300
	Small Holes*	300	1,000	3,000	10,000
	Large Holes*	10,000	30,000	100,000	300,000
Composite liner (poor field conditions, i.e., waves)	Diffusion	0.01	1	100	300
	Small Holes*	0.8	6	50	400
	Large Holes*	1	7	60	500
Composite liner (good field conditions, i.e., flat)	Diffusion	0.01	1	100	300
	Small Holes*	0.15	1	9	75
	Large Holes*	0.2	1.5	11	85
		Values of leakage rate are in lphd (values can be divided by approximately 10 to obtain values expressed in gpad)			

*assumes 3 holes/ha (i.e., 1.0 hole/acre)

Theoretical Example 1 continued

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- Use a leakage rate of 2 l/ha/day into your risk analysis for the whole facility, pollution control dam included.
- Risk analysis shows no significant impacts.
- Great! Recommend Class C liner.

BUT:

- The literature you've used is from 1989, and parts have been superceded.
- You haven't checked the assumptions made in the 1989 paper. (USA typically requires clay liners of 1m thick, constructed in layers with permeability of minimum 1 x 10^{-7}cm/s, and construction quality assurance (CQA) on site, and chemical compatibility testing, etc etc).

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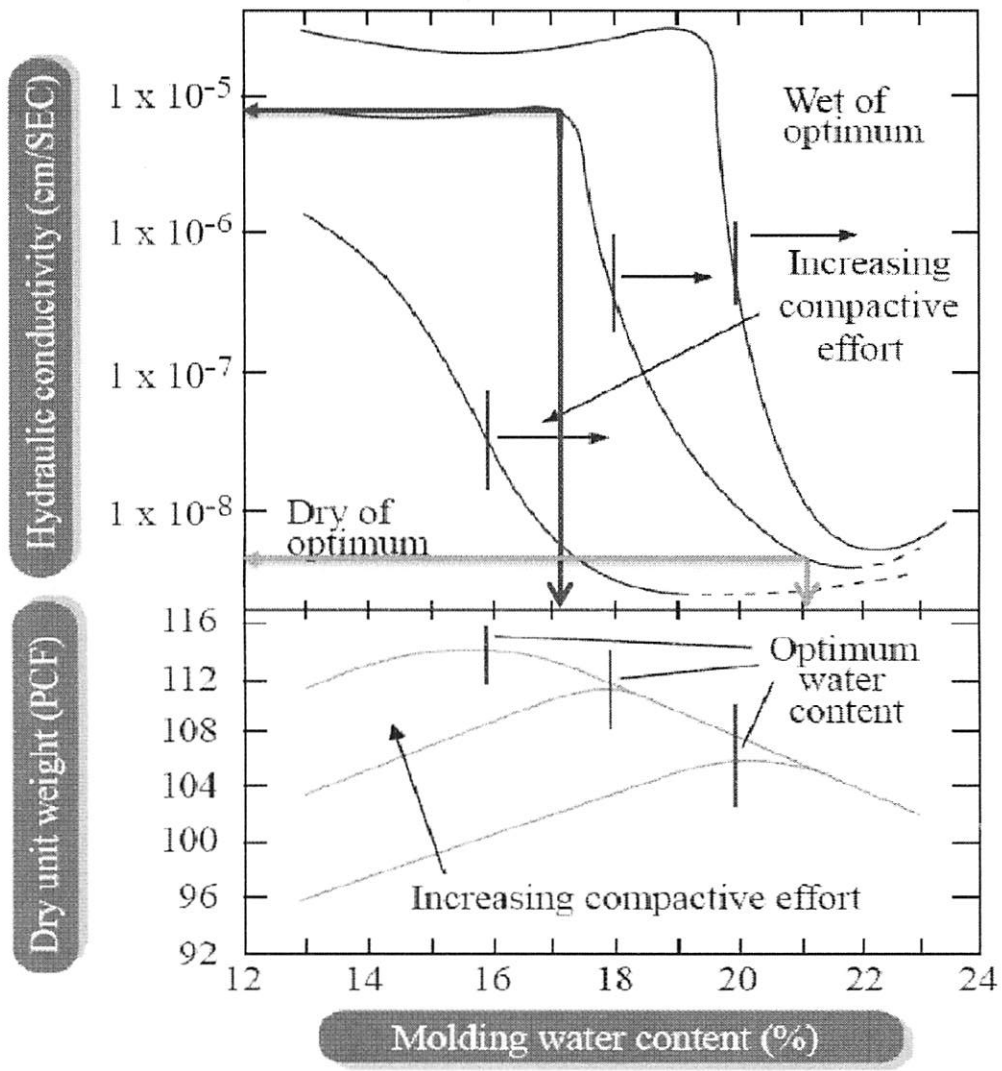
Theoretical Example 1 continued

AND:

You haven't taken into account that the Class C liner design is for a waste site generally with limited liquid input and output, and finger drains are not likely to drain wet tailings sufficiently, plus you have a pollution control dam with a much higher liquid head.

THEN:

The Contractor doesn't really understand the objectives. He messes up the selection from borrow, doesn't control moisture content of the clay liner, builds 1 x 300mm layer instead of 2 x 150mm layers, and only uses a smooth roller for compaction. The "clay liner" contains large particles that can damage the overlying geomembrane.



Effect of molding water content and compactive energy on hydraulic conductivity.

Adapted from: Daniel, D. E. "Clay Liners." *Geotechnical Practice for Waste Disposal.* Edited by D. E. Daniel. New York: Chapman & Hall, 1993, pp. 137-163.

A difference of <8% moisture content of this soil at the time of compaction makes a difference of 1000 times to its permeability/ hydraulic conductivity using standard Proctor compaction.

<u>So if compacted too dry, the soil liner could let 1000 times more seepage through than if its minimum permeability was achieved</u>.

Theoretical Example 1 continued

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AND:

- There isn't quality control or assurance on placement of the geomembrane, it's from a dodgy supplier, and is full of tiny pinholes and sub-standard welds.
- There is no wrinkle control on site, and the geomembrane is really wrinkled when it's time to cover it. Black plastic in Africa?
- It's really hard putting a 100mm sand layer over a geomembrane! No-one is checking that the sand doesn't contain large particles that could damage the geomembrane, big trucks and plant are used, and these nick the top of the geomembrane wrinkles.

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Liner wrinkling

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Fig. 11. Photograph of wrinkles at QUELTS (same bottom liner as shown in Fig. 8) on 23 March 2007 when ambient temperature was 9 °C. Note longitudinal wrinkles at 3.3 m spacing are beginning to form. White patches are what remain of a sprinkling of snow on liner from the previous night. Water puddles from melting snow are constrained from flowing off the base (slope 3% from left to right — north to south) by the wrinkles.

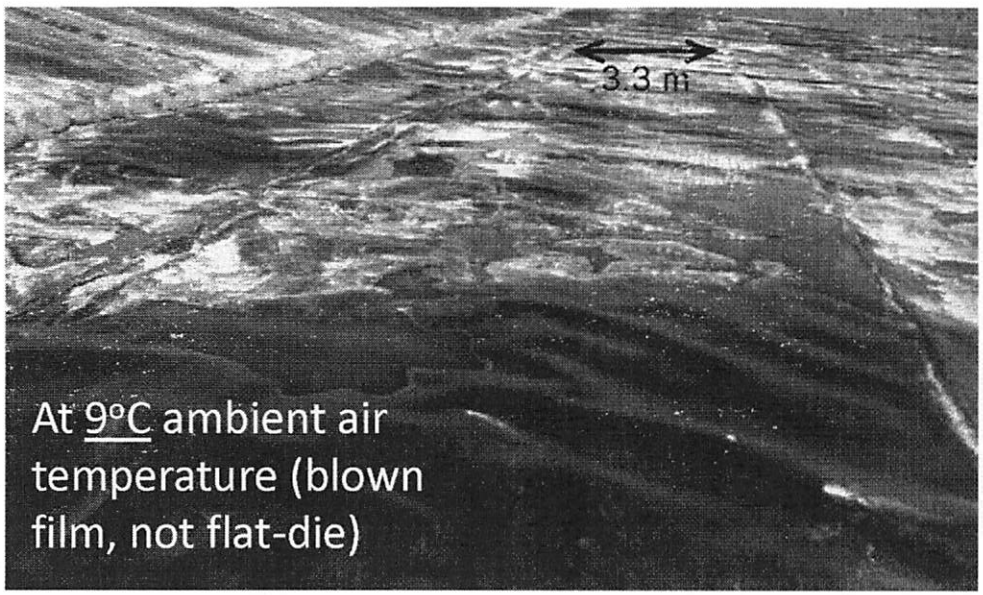
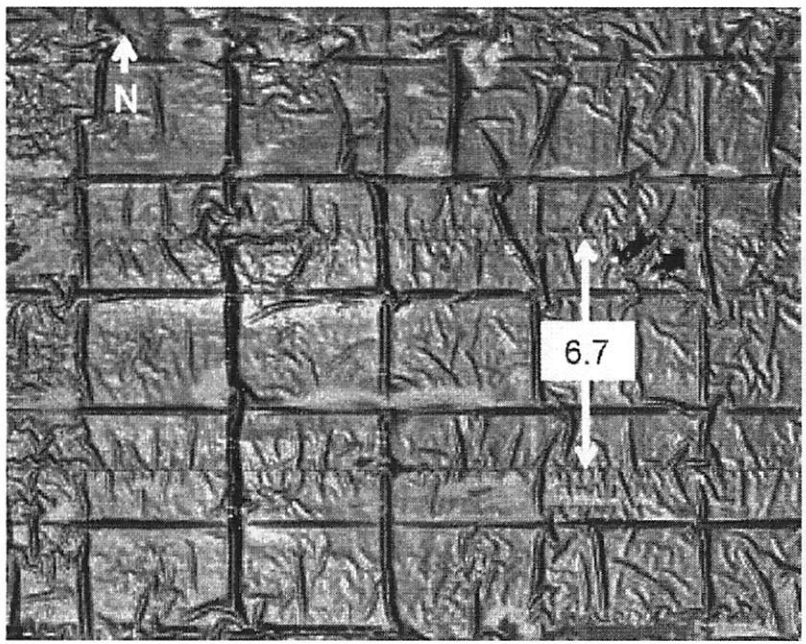


Fig. 12. Aerial photo showing a small portion of connected wrinkle network on the base liner at QUELTS (same bottom liner as shown in Figs. 8 and 11) (modified from Rowe et al.[2]). Photo taken on 28 May 2008 at 1300; air temperature of 11 °C; GM temperature on the base of 53 °C. Distance between GM seams is approximately 6.7 m as shown.



At 11°C ambient air temperature

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

Theoretical Example 1 continued

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PROBLEMS:

- The geomembrane line is riddled with pinholes, and has tears along the top of the wrinkles, and some gaps in the welds. This allows a lot of flow through to the "clay liner" below, especially as the wrinkles are linked.
- Because the clay liner wasn't constructed properly, the permeability is now 1 x 10^{-5}cm/s instead of 1 x 10^{-7}cm/s (i.e. 100 times more permeable).
- There isn't good contact between the "clay" and the geomembrane, so they don't work as a composite liner.
- The liquid head on the liner rapidly builds up on the liner as the above liner finger drains can't cope, and easily reaches 15m with time.
- The leakage value used in the Risk Analysis wasn't accurate to start with.

Theoretical Example 1 continued

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RESULT:

- The actual leakage rate is more than 10 000 times the value used in the risk analysis, and major ground water pollution occurs as a result.
- The vast majority of the leakage from the tailings dam isn't collected, because there are only finger drains below the "lining system". (The finger drains weren't designed to handle such high flows anyway.)
- Because fairly low leakage rates were picked up in the underperforming underliner finger drains, no-one questioned if the liners were working until pollution of groundwater has occurred.
- The client has wasted the money they did spend on liners, as these have made very little difference.

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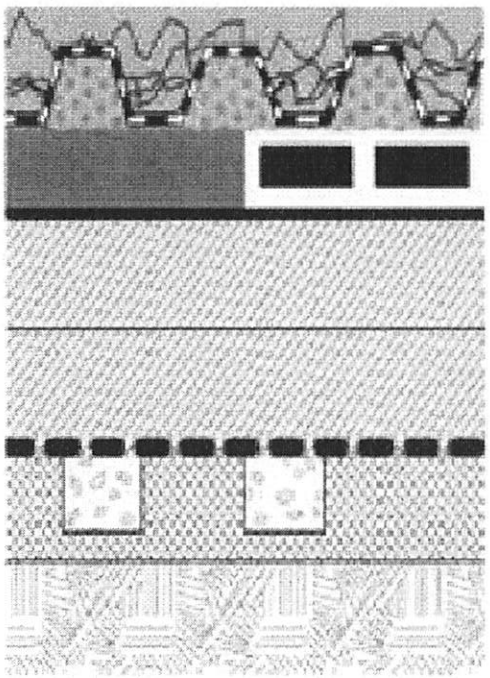
Theoretical Example 2

- Large, wet tailings facility proposed.
- Assume a Class C liner from the National Norms and Standards:



Waste body

300 mm thick finger drain of geotextile covered aggregate

100 mm Protection layer of silty sand or a geotextile of equivalent performance

1,5 mm thick HDPE geomembrane

300 mm clay liner (of 2 X 150 mm thick layers)

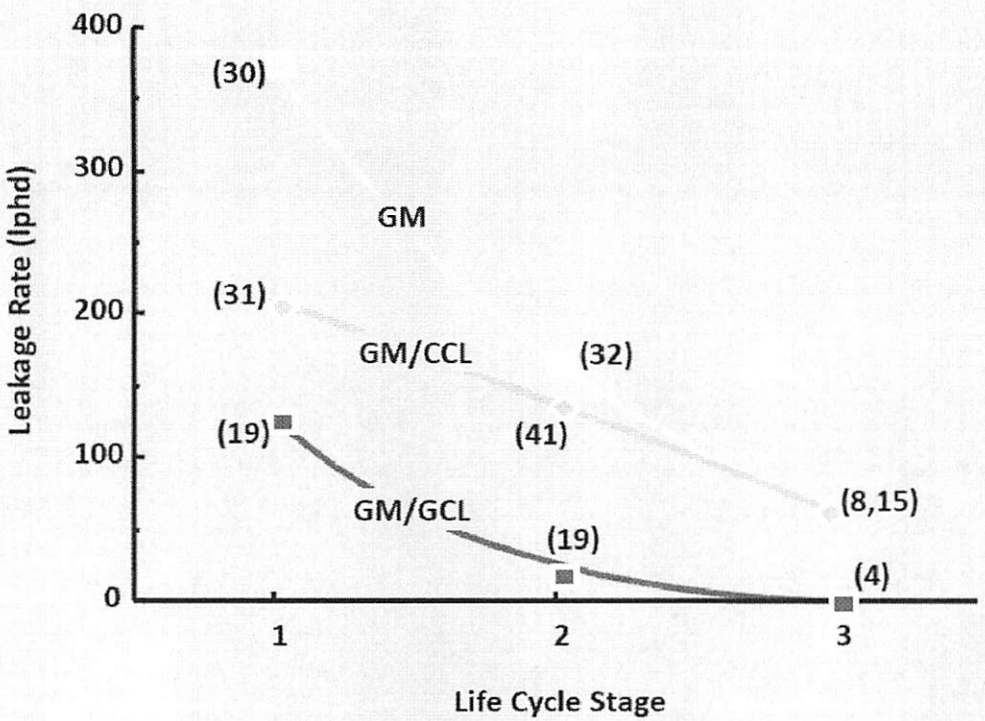
Under drainage and monitoring system in base preparation layer

In situ soil

Theoretical Example2

- Have a look at some literature – find some historical leakage results.

Average Values of Leakage Quantities
(ref. EPA CR-821448-01-0, 2002)



Bonaparte, R., Daniel, D.E and Koerner, R.M., 2002. Assessment and Recommendations for Improving the Performance of Waste Containment Systems. Report EPA/600/R-02/099, United States of America

Theoretical Example 2 continued

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- WOW – look at how low those geomembrane/ geosynthetic clay liner (GM/GCL) average leakage rates are compared to the geomembrane/ compacted clay liner (GM/CCL) ones – let's use a GCL!
- Use a leakage rate of 35 l/ha/day in your risk analysis for the whole facility, pollution control dam included.
- Risk analysis shows no significant impacts.
- Great! Recommend a Class C liner with a GCL replacing the CCL.

BUT:

- You haven't checked the assumptions made in the 2002 study. (These are landfills, not wet tailings facilities, and the US requires CQA on site, chemical compatibility testing, etc etc etc).

Theoretical Example 2 continued

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AND:

- You haven't considered chemical compatibility between the expected seepage from the tailings dam and the GCL, or the quality of the underlying soil pore water, or any likelihood of high head on the liner.

THEN:

- There is quality control on site, but the specification doesn't address wrinkle control of the geomembrane. So there is no wrinkle control on site, and the geomembrane is really wrinkled when it's time to cover it.

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Theoretical Example 2 continued

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THEN:

- Again, it's really hard putting a 100mm sand layer over a geomembrane! Big plant is used, and machines nick the top of the geomembrane wrinkles.

PROBLEMS:

- There are some tears along the top of the wrinkles, which allow a lot of flow through to the GCL below, especially as the wrinkles are linked.
- Cation exchange occurs in the GCL: the sodium ions are replaced with calcium (or other) cations in the sodium bentonite. The GCL may now be up to 1 000 times or even 10 000 times more permeable than it was to start with.

Theoretical Example 2 continued

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PROBLEMS:

- The liquid head on the liner rapidly builds up on the liner as the above liner finger drains can't cope, and easily reaches 15m with time.
- The leakage value used in the Risk Analysis wasn't accurate to start with for this case.

RESULT:

- The vast majority of the leakage from the tailings dam isn't collected, because there are only finger drains below the lining system. (The finger drains weren't designed to handle such high flows anyway.)

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Theoretical Example 2 continued

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RESULT:

- The actual leakage rate is 1 000 or so times the value used in the risk analysis, and major ground water pollution occurs as a result.
- Because fairly low leakage rates were picked up in the underperforming underliner finger drains, no-one questioned if the liners were working until groundwater pollution occurred.
- The client has wasted the money they did spend on liners that have made very little difference.

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So what can we learn from this?

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- You need to use recent literature for liner leakage equations.
- Not all liners are the same.
- Don't use leakage rates from studies from countries with higher design specs and strict CQA requirements unless you plan on meeting those specs and requirements.
- The leakage rate range used in risk analyses should be calculated by specialists who understand what affects liner performance – head on liners, chemical compatibility, material specifications, construction specifications, construction quality assurance, operational risks and requirements, rehabilitation risks and requirements, etc etc.
- Assumptions must be carried through to the design, material specifications, construction, operation and rehab phases.
- Calculate leakage rates for dams separately.

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HOW TO ESTIMATE LEAKAGE RATES

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1. Obtain facility information including size, chemistry and moisture content of residue, seepage info, climate, geotech etc

2. Consider whether comparable existing facilities are polluting

3. Theoretical liner design

4. Calculate likely range of leakage for theoretical liner design from formulae in recent literature, considering chemical compatibility etc

5. Cross-check with values in literature if comparable

6. Determine if impacts from the leakage range calculated would be acceptable or not *(RISK ANALYSIS)*

NO? Go back to Step 3.

YES!

7. State all assumptions regarding materials, construction, protection, operation and rehabilitation clearly

8. Ensure that all assumptions regarding materials, construction, protection, operation and rehabilitation are carried into subsequent document and are met

9. Compare measured leakage rates to estimated range

10. Monitor impacts, and mitigate where necessary

Other suggestions

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- This needs to be multi-disciplinary and consultative.
- There may well need to be iterations.
- Rather than have a competent person who isn't an engineer with experience and competence in liners recommend a barrier system from the risk analysis, a maximum leakage rate to environment should be recommended.
- The design, material sourcing, construction operation and rehabilitation should then aim to maintain leakage rates below the maximum specified through the life cycle of the facility.

Calculating liner leakage rates

Table 1 - Generalized Leakage Rates Through Liners
(ref. Giroud and Bonaparte, Jour. G & G, 1989)

1989!

Type of Liner	Leakage Mechanism	Liquid height on top of the geomembrane			
		0.03 m	0.3 m	3 m	30 m
Geomembrane alone (between two sand layers)	Diffusion	0.01	1	10	300
	Small Holes*	300	1,000	3,000	10,000
	Large Holes*	10,000	30,000	100,000	300,000
Composite liner (poor field conditions, i.e., waves)	Diffusion	0.01	1	100	300
	Small Holes*	0.8	6	50	400
	Large Holes*	1	7	60	500
Composite liner (good field conditions, i.e., flat)	Diffusion	0.01	1	100	300
	Small Holes*	0.15	1	9	75
	Large Holes*	0.2	1.5	11	85
		Values of leakage rate are in lphd (values can be divided by approximately 10 to obtain values expressed in gpad)			

*assumes 3 holes/ha (i.e., 1.0 hole/acre)

These formulae don't take account of geomembrane wrinkles.
Beware - some modelling programmes use these formulae.

Giroud, J.P. and Bonaparte, R. (1989). Leakage through Liners Constructed with Geomembranes – Part I. Geomembrane Liners. Part II. Composite Liners Geotextiles and Geomembranes, Vol. 8 No's 1&2.

Calculation developments

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19411

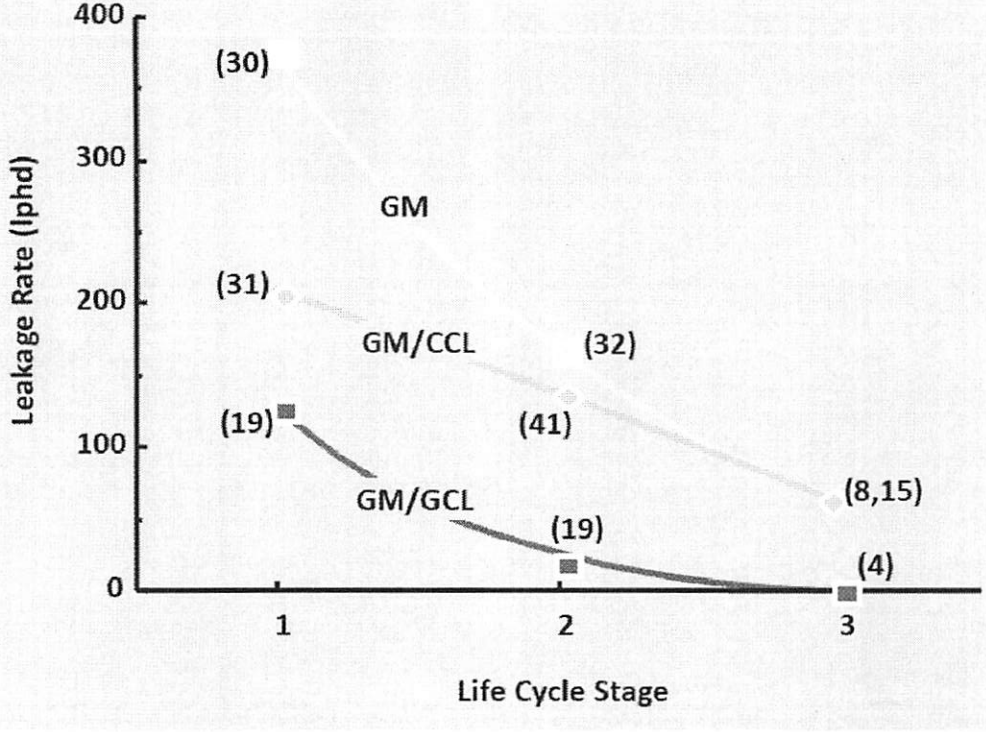
- Rowe and Booker (1998) developed formulae that included transmittivity effects between a geomembrane and underlying clay/GCL, and took the thickness of the clay layer into account, and wrinkles.

Rowe, R.K. and Booker, J.R. (1998). Theoretical Solutions for Calculating Leakage through Composite Liner Systems. Geotechnical Research Centre Report GEOT-18-98.

Theoretical versus actual leakage rates

- EPA noted that there were big discrepancies between theoretical and measured leakage rates.

Average Values of Leakage Quantities
(ref. EPA CR-821448-01-0, 2002)



Bonaparte, R., Daniel, D.E and Koerner, R.M. (2002) Assessment and Recommendations for Improving the Performance of Waste Containment Systems. Report EPA/600/R-02/099, United States of America

Calculation developments

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- Rowe (2005) again presented calculation of leakage through composite liners, taking linked, linear wrinkles into account.
- These calculations provide a much more realistic range for leakage from composite liners than 1989 calculations.

Rowe, R.K. (2005). Long-term performance of containment barrier systems. 4th Rankine Lecture. Géotechnique 55, No 9, pp 631-678.

Calculation developments

Institute of Waste Management of Southern Africa

- Rowe (2012) provides an excellent overview of the factors to be taken into account in determining short- and long-term leakage through composite liners.

KEY PAPER

Rowe, R.K. (2012). Short- and long-term leakage through composite liners. The 7th Arthur Casagrande lecture, Canadian Geotechnical Journal, Vol. 49 pp 141-169.

From Rowe (2012)

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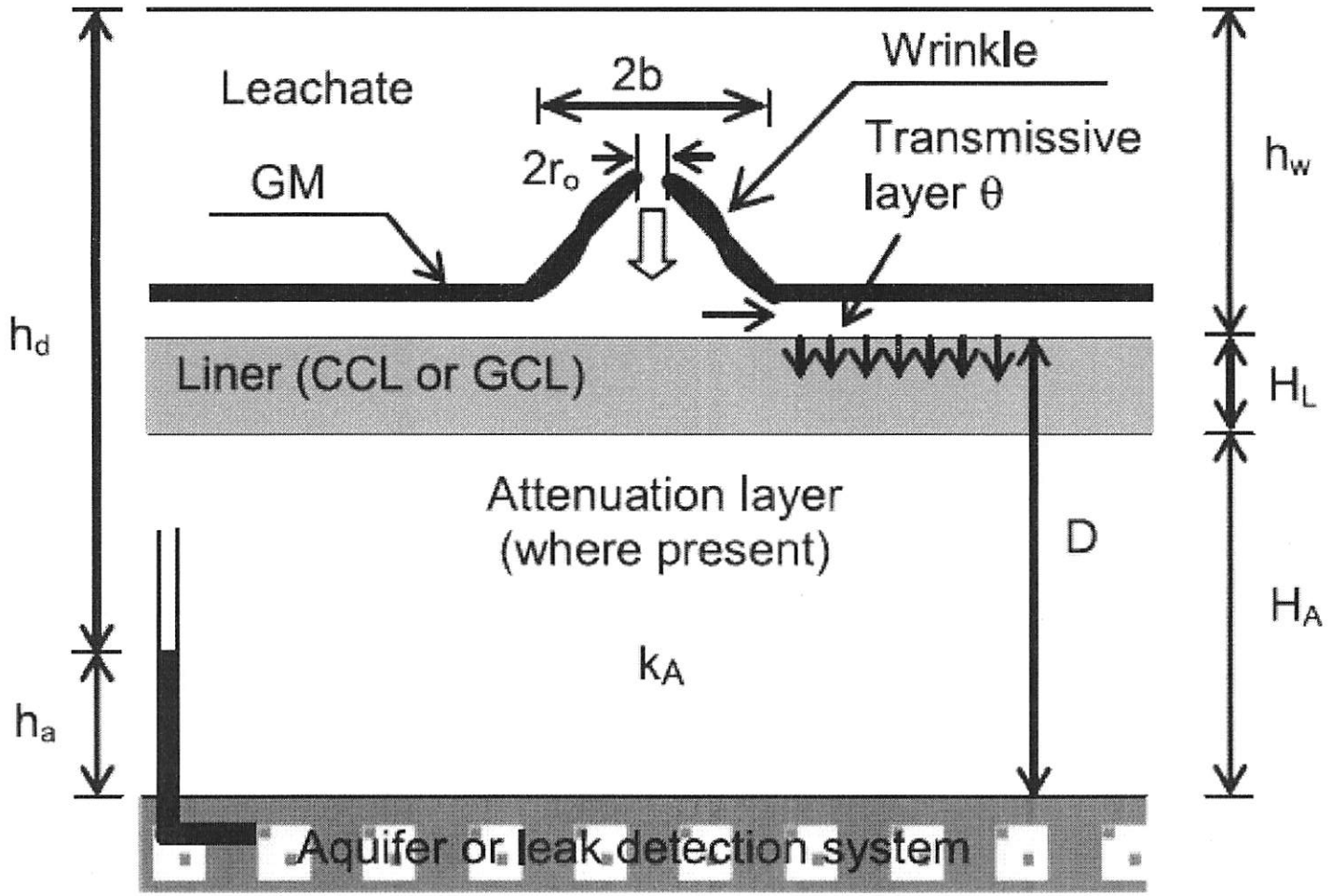
Fig. 10. Schematic showing leakage through a wrinkle of length L and width $2b$ with a hole of radius r_o (adapted from Rowe 1998).



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From Rowe (2012)

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Rowe (1998) had developed a simple equation to predict leakage through a hole in a GM coincident with (or adjacent to) a wrinkle (Fig. 10) which, in its simplest form (assuming no interaction between adjacent wrinkles), can be written:

$$[6] \qquad Q = 2L[kb + (kD\theta)^{0.5}]h_d/D$$

where Q is the leakage (m^3/s); L is the length of the connected wrinkle (m); k is either the hydraulic conductivity (m/s) of the clay liner, k_L, if there is no AL or the harmonic mean of the CL and AL hydraulic conductivities, k_s, if there is an AL; $2b$ is the width of the wrinkle (m); $D = H_L + H_A$ is the thickness of the CL and AL (m); θ is the transmissivity of the GM–CL interface (m^2/s); and $h_d = (h_w + H_L + H_A - h_a)$ is the head loss across the composite liner (m). All of these parameters except the connected wrinkle length and wrinkle width are as previously discussed. What is needed to use eq. [6] is an indication of the likely values of L and $2b$.

Class A Primary Liner: Tight control

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Controlling for small wrinkles

600mm CCL 2mm HDPE geomembrane composite Primary Liner

L	14	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.05	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	1.5		head loss across composite liner
Leakage	2.20387E-07	m3/s	Rowe (2012)
Leakage	19.04	litres per wrinkle per day	
Say you have 3 wrinkles with holes per hectare			
57.12	litres per hectare per day		

Class A Primary Liner: Less control

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Much bigger wrinkles

600mm CCL 2mm HDPE geomembrane composite Primary Liner

L	500	m	length of wrinkle
k	0.000000001	m/s	permeability of underlying liner
b	0.1	m	half the width of the wrinkle
D	0.6	m	thickness of the liner and attenuation zone
Theta	0.000000016	m2/s	transmissivity of the interface
hd	1.5		head loss across composite liner
Leakage	7.99597E-06	m3/s	Rowe (2012)
Leakage	690.85	litres per wrinkle per day	
Say you have 10 wrinkles with holes per hectare			
6908.52	litres per hectare per day - *liquid outputs could be limited by liquid inputs*		