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Dear Interested Parties,

The Forest Service prepared the enclosed *Federal On-Scene Coordinator (OSC) Report*, dated December 27, 2023, for the San Mateo Uranium Mine (Site) environmental remediation project performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 2013. This report provides a summary of the remediation and site inspections performed in last 10 years. The response objectives were met, and no further response action is planned at this Site.

For additional information, please contact Maria McGaha, Regional Environmental Engineer, at maria.mcgaha@usda.gov, or Hailey Stock, Assistant Regional Environmental Engineer, at hailey.stock@usda.gov.

Sincerely,

KRISTIN
BAIL

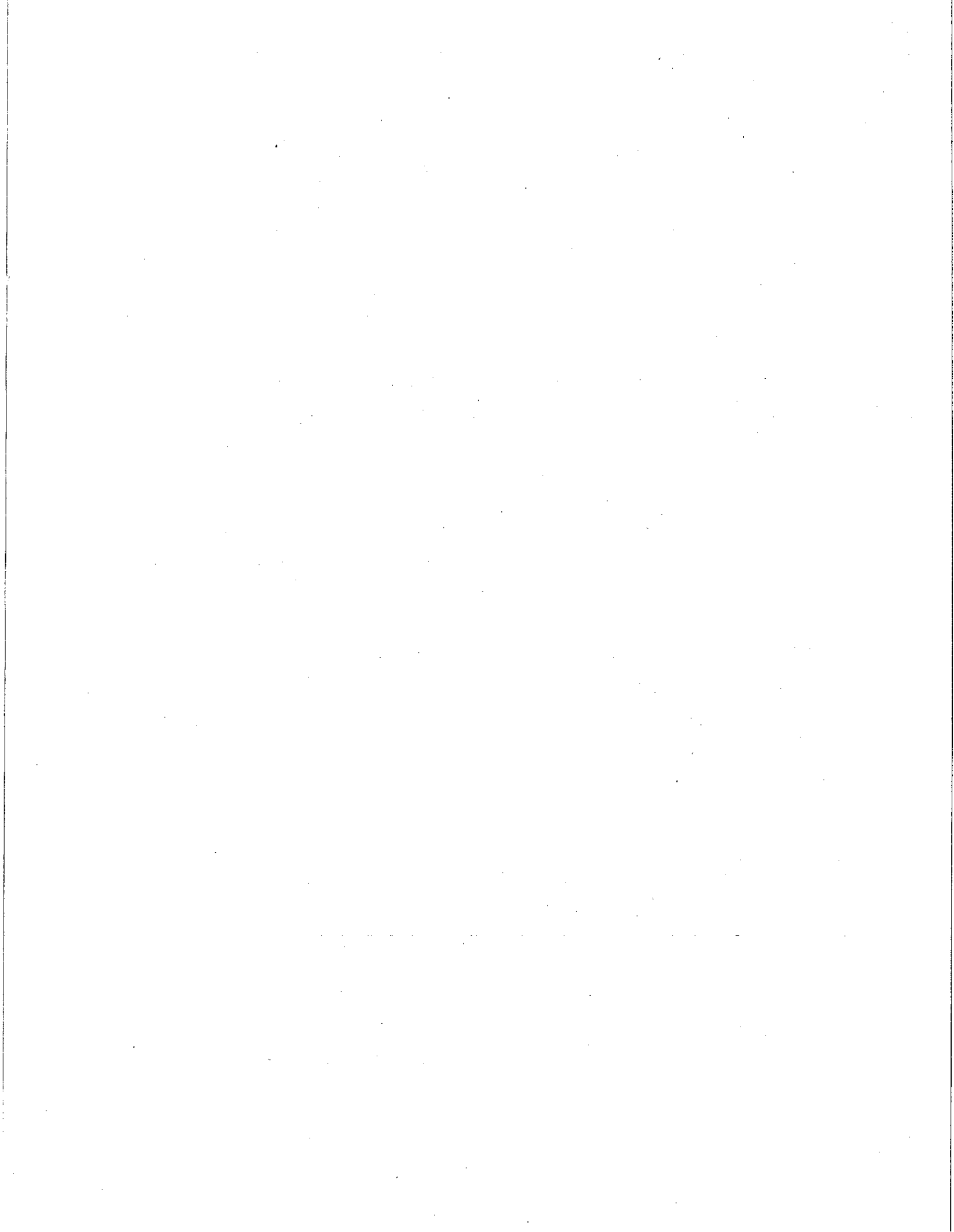
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MICHIKO J. MARTIN
Regional Forester

Enclosure: 1

cc: Project Mailing List

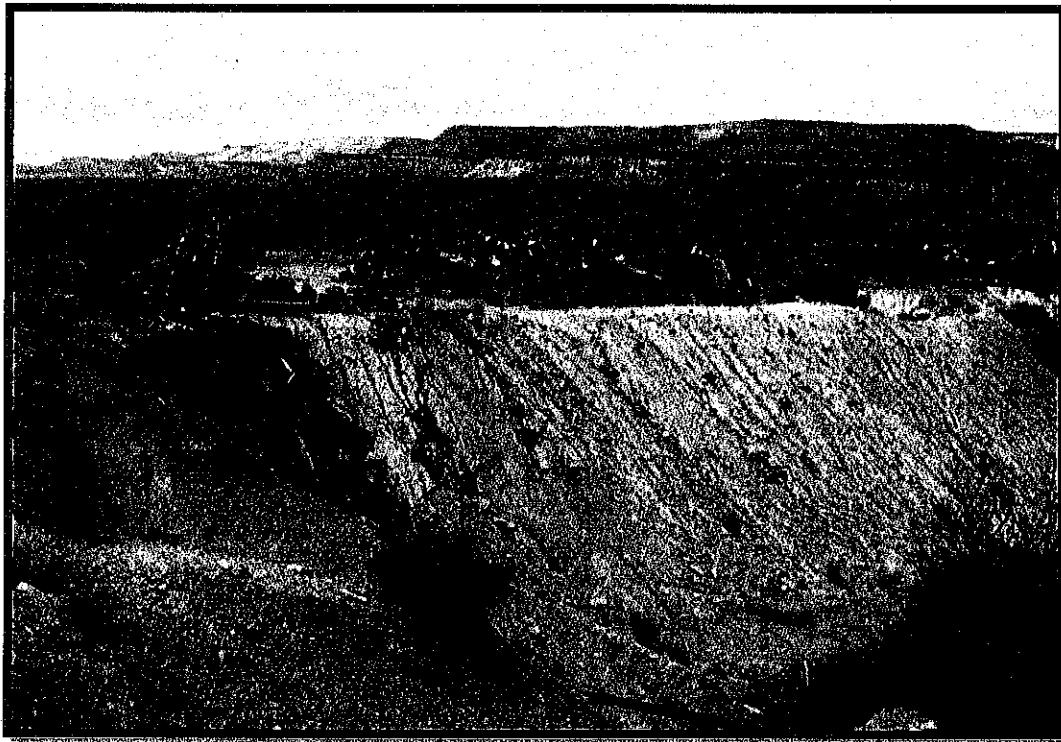




FEDERAL ON-SCENE COORDINATOR REPORT

**Comprehensive Environmental Response Compensation and Liability Act
CERCLA Removal Action
San Mateo Uranium Mine**

**Mt. Taylor Ranger District
Cibola National Forest, New Mexico**



Waste Rock Piles at San Mateo Mine before Removal

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333 Broadway SE

Albuquerque, NM 87102

December 27, 2023

1.0 Summary of Events & Background

The San Mateo Uranium Mine (Site) is an inactive mine located in Cibola County, New Mexico. The Site is within the boundaries of the Cibola National Forest on land administered by the Forest Service and is under the jurisdiction of the Mt. Taylor Ranger District. The legal description is the Northeast (NE) 1/4, Section 30, Southeast (SE) 1/4 of Section 19, and the West (W) 1/2 of the Northwest (NW) 1/4 of Section 29, Township 13 North, Range 8 West, of the New Mexico Principal Meridian.

Past mining activities left approximately 180,000 cubic yards of uncovered and uncontrolled waste rock that contained elevated levels of radionuclides. Some mine waste had migrated onto adjacent private lands.

The original mining claims for the San Mateo Mine were filed in 1955. The San Mateo ore body was delineated by drilling in 1957. The initial estimates of reserves were 840,000 to 2.2 million tons of uranium ore.

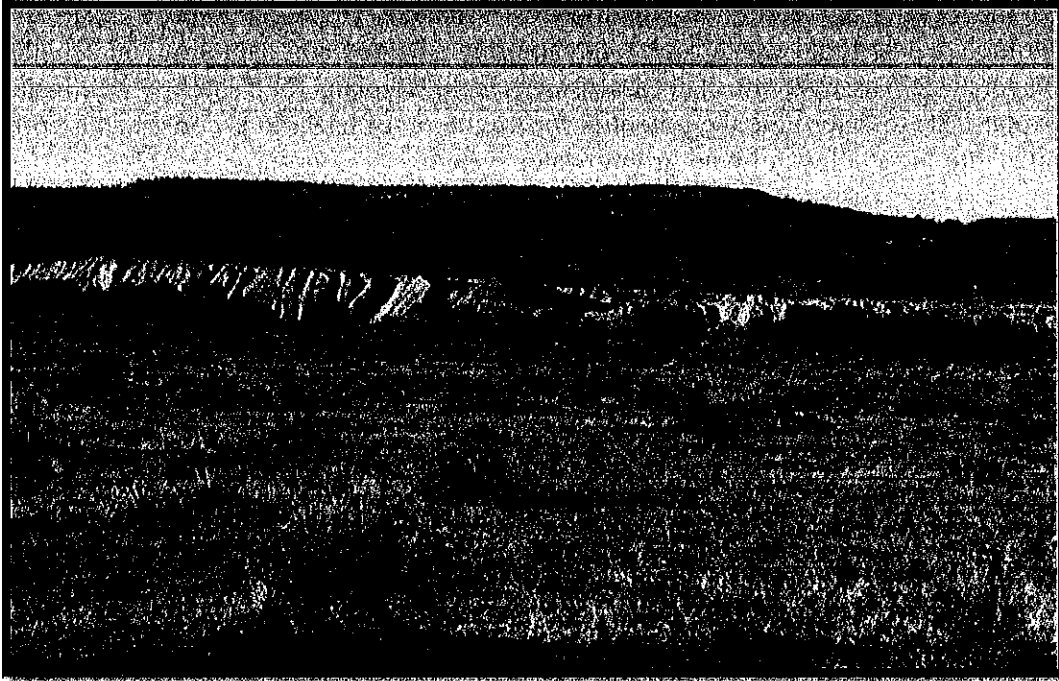
Rare Metals Corporation (associated with El Paso Natural Gas Corporation) began mine development with construction of the mine shaft beginning in 1957 and completion in 1959. The first ore was shipped in 1959 and production continued sporadically until at least 1971. Rare Metals Corporation operated the mine from 1957 to 1962. El Paso Natural Gas Corporation assumed operations from 1962 until 1964. Following production shutdowns due to mine water and shaft delays, the mine was sold to United Nuclear Corporation (UNC), which operated the mine directly from 1964 to 1971. UNC ceased mining at the San Mateo site in January 1971. Mine production to January 1, 1970 was reported as 785,000 tons of 0.17% ore, making the San Mateo Mine one of the largest uranium mines in the United States.

Minor exploration and assessment work continued until 1984. Between 1971 and 1979, UNC retained Teton Exploration Drilling Company, Inc. (Teton) to conduct mine claim assessment work on the San Mateo claims. UNC purchased Teton in 1979 and continued conducting mine claim assessment work until 1981 when UNC sold its interest in the mining claims to Homestake Mining Company (Homestake).

Uranium ore was mined from an 8-foot-thick deposit in the Brushy Basin Sandstone approximately 1,050 feet below ground. Surface facilities consists of a head frame/hoist/ore bin structure, warehouse/change room/office building, machine shop/hoist, power plant building, mine waste dump, settling ponds, and access roads. A warehouse building near the shaft opening housed cable drums that activated the skip cages. The shaft included a pump at the 900 feet depth to remove groundwater. After drilling and blasting the mine stopes, ore was moved to the draw point, allowed to fall into ore cars in the lower level, and hauled to the ore loader at the bottom of the shaft. When ore was brought to the surface, it was unloaded and measured into trucks, which transported the ore to a uranium processing mill.

No ore was milled on-site. Waste rock was disposed of at the mine head in a series of waste rock terraces. Since the mine closed in 1971, all buildings and surface facilities have been removed with only small remnants of the former surface structures visible. The main shaft and

the emergency shaft/air shafts associated with the mine had been sealed. The mine road, waste rock pile, north pad, and several settling ponds remained at the site prior to the removal action (cleanup).



View of Waste Rock Pile at San Mateo Uranium Mine

Site Investigations

Several studies conducted at the Site identified mine features that pose a potential threat to human health and the environment. The San Mateo Mine was identified in the September 1986 New Mexico Environmental Improvement Division (NMEID) Report which evaluated the hydraulic connection between surface waters and shallow alluvial groundwater for San Mateo Creek. The study concluded that mine discharges (possibly the San Mateo Mine) have chemically impaired the San Mateo Creek's shallow alluvial aquifer down gradient from the Site.

In 1988, New Mexico Environment Department (NMED) conducted a Site Discovery and Preliminary Assessment of the Site. This very limited investigation documented "large spoils piles containing high concentrations of selenium, molybdenum, radium-226, and gross-alpha activity." In January 1989, after review of the NMED report, EPA recommended to the USDA Forest Service that a Screening Site Inspection be conducted, including a radiological survey, sampling to characterize the wastes, and an investigation of the shallow alluvial aquifer.

In 1993, on behalf of the Forest Service, Science Applications International Corporation conducted a Site Inspection of the site including radiological field screening, and waste rock and environmental (soil, air, sediment, and groundwater) sampling. Elevated metals concentrations above background were measured in soil samples collected from the waste rock pile and north pad area. No contaminants were detected in air samples collected upwind and downwind of the site. The January

1994 Site Inspection Report documented elevated levels of gamma radiation and migration of radioactive contaminants from the Site.

In September 2010, on behalf of the Forest Service, Science Applications International Corporation prepared the Final Engineering Evaluation/Cost Analysis (EE/CA) Report. Site investigation activities included soil and waste rock pile sampling, shallow soil sampling, and shallow alluvial groundwater system assessment. This assessment included plans for a shallow well installation and groundwater tests to determine the potential for migration of hazardous constituents from the mine waste piles into the shallow alluvial groundwater system.

A Dose Radiological Survey and Gamma Walkover Survey were also included in the EE/CA. Significantly elevated levels of gamma radiation measured over the waste rock pile and north pad confirm that these are the two primary areas of radiation contamination at the Site. In addition, sampling results indicate that the radioactive contamination is being transported from the Site via runoff and surface water flow mobilized via precipitation and surface water.

The Dose Rate Survey determined the background gamma level radiation around the perimeter of the Site and at the base of the arroyo leading offsite is less than 50 Micro Roentgens per Hour. The waste rock pile and the north pad show readings above 100 Micro Roentgens per Hour with individual readings as high as 800 Micro Roentgens per Hour indicating gamma radiation activity.

The Gamma Walkover Survey determined an elevated level of gamma radiation centered on the waste rock pile and north pad. Significant gamma contamination was observed between the north pad and waste rock pile and north beyond the Site boundary onto private land. The extent of the gamma radiation beyond the northern site boundary suggests that contamination has been transported downgradient with the most obvious mechanism being surface water runoff.

Analytical soil results documented elevated levels of uranium and selenium in the waste rock. Uranium levels were between 38 mg/kg and 1380 mg/kg, approximately over 100 times those found as background (0.41 – 1.65 mg/kg).

A shallow groundwater alluvial system assessment was conducted during the preparation of the EE/CA. During this assessment seven drilling attempts were made and all seven were met with refusal due to subsurface obstructions. No shallow groundwater has been identified at the site. The EE/CA concluded that results of this assessment determined that no groundwater was present in the shallow groundwater alluvial system.

From the EE/CA report, the Forest Service confirmed that soil and waste sources at the Site contain radionuclides (uranium, thorium, and radium) that pose a potential threat to human health and the environment. It was also confirmed that the soil and waste sources have physically been transported due to runoff onto adjacent private land.



Removal of Contaminated Soil on East Side of Mine in August 2012

Response Action

On April 18, 2011, the Forest Service approved an environmental remediation (cleanup) at the Site under its CERCLA authorities. Based on the analysis and findings of the EE/CA, the following Removal Action Objectives for the response action were developed for the Site:

- Reduce on-site gamma radiation exposures of on-site human receptors below a 1/10,000 increased cancer risk.
- Minimize or eliminate potential for exposure via direct contact of human and ecological receptors to unacceptable concentrations of radionuclides in the waste material.
- Minimize or eliminate the release of waste material contaminated with radionuclides from the Site into the San Mateo Creek watershed or onto nearby private land via the surface water pathway.
- Reduce or eliminate the migration of radionuclides from the site via the air pathway.
- Minimize ingestion and uptake of radionuclides by plants and animals.

To accomplish these objectives, the Forest Service selected cleanup action levels based on the Uranium Mill Tailings Radiation Control Act (UMTRCA) soil standard of 5 pCi/g of radium 226 plus background. The UMTRCA soil standard is based on residential land use and is protective of human health. Based on background studies, the cleanup action level for the site will be 5.83 pCi/g of radium-226 averaged over the first 15 cm of soil.



Repository Construction in October 2012

A Unilateral Administrative Order ("Order") was issued on June 27, 2011, to the potentially responsible parties directing them to clean up the site. This Order was issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a), and delegated to the Secretary of Agriculture by Executive Order 12580, as amended by Executive Order 13016, 61 Fed. Reg. 45871 (August 30, 1996). This authority was further delegated to the Director of the USDA Office of Procurement and Property Management and the Chief of the Forest Service, to be exercised with the concurrence of the General Counsel. 7 C.F.R. § 2.93(a)(17)(xiv).

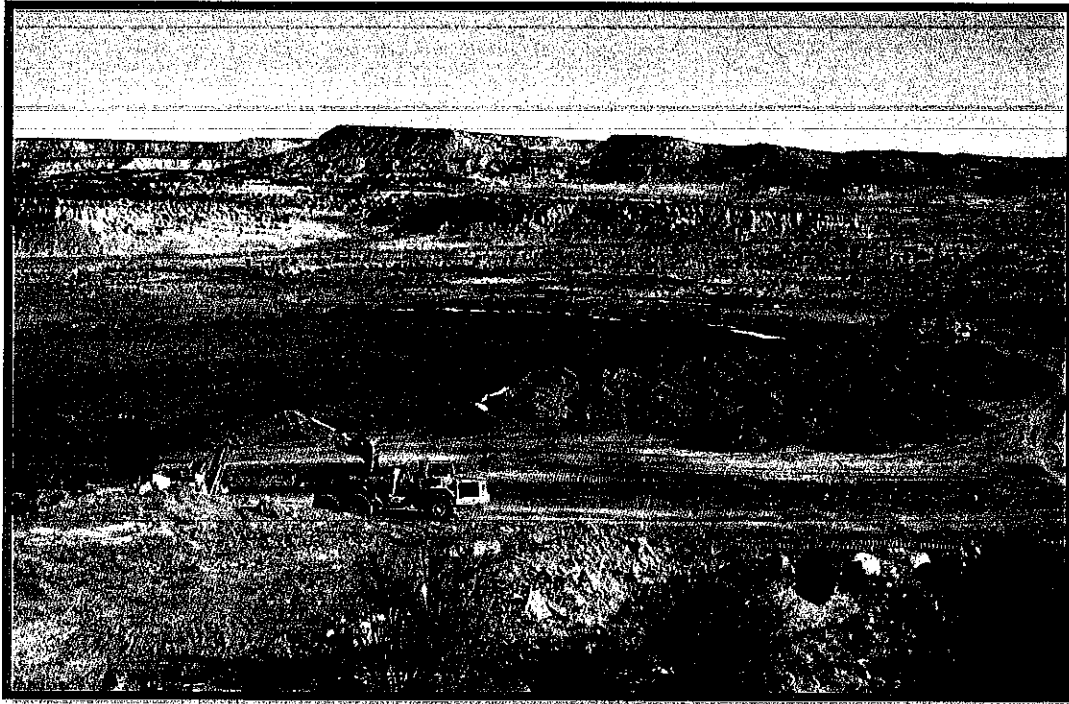
This Order directed Respondents to implement the Removal Action for the San Mateo Mine Site described in the Statement of Work. This Order was issued to Respondents United Nuclear Corporation, El Paso Natural Gas Co., Homestake Mining Co. of California, and Western Energy Development Corp. Western Energy Development was eventually dropped from participation.

2.0 Chronological Narrative of the Removal Action

In coordination with the Forest Service, United Nuclear Corporation, El Paso Natural Gas Company, and Homestake Mining Company of California (companies) performed the cleanup of the San Mateo Uranium Mine. The companies contracted with the firm MWH to perform the overall engineering design and construction management of the response action.

The Project Work Plan was approved by the Forest Service on October 17, 2011. Between October 17 and 21, 2011, Lone Mountain Archeological conducted an archeological survey of the Site. MWH and AVM began the Pre-Design Studies on October 31, 2011. AVM Environmental Services was a subcontractor for MWH and performed the radiation surveys. Field work for the Pre-Design Studies was completed on November 15, 2011, except for the topographic survey. The topographic

survey was delayed due to heavy snows in December. The design package was completed and approved by the Forest Service on June 29, 2012.

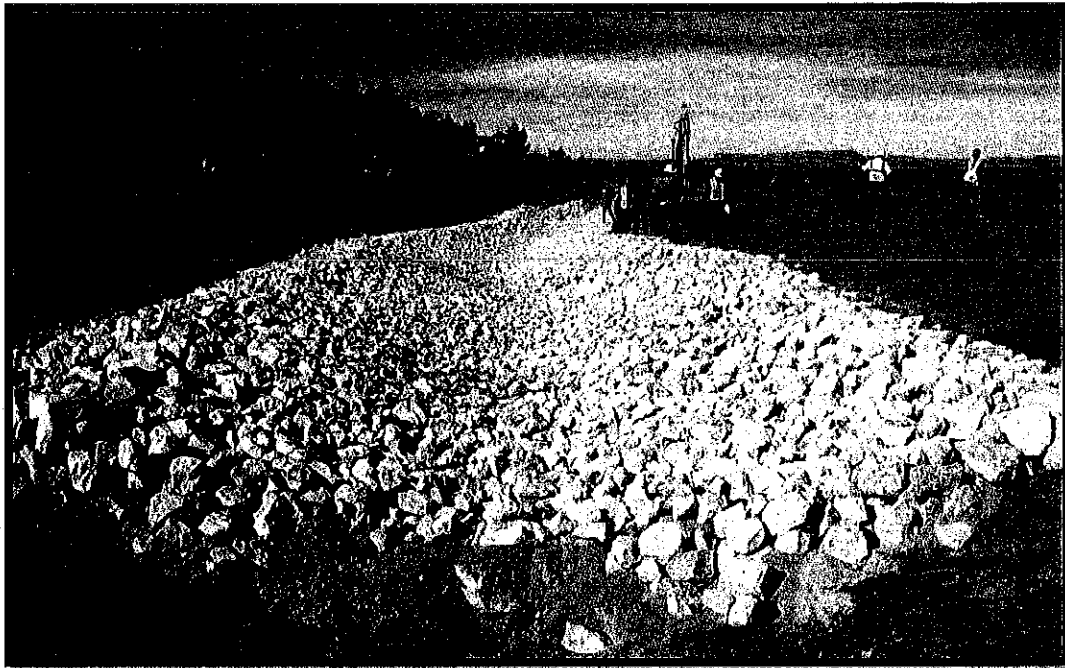


Placement of Cover Material on Repository in November 2012

The companies selected Envirocon, an environmental remediation company, to perform the cleanup. On August 6, 2012, Envirocon mobilized to the mine site and began construction activities. MWH continued its role as project manager and inspected the project regularly. Silt fences were installed around the perimeter to prevent the transport of sediment off the site. Roadway improvements were also made in August.

Work during the month of September included dust control, excavation and demolition of on-site mining debris and placement in the repository, and grading of waste piles in the repository. The contaminated material in areas 4, 8, 9, 10, 14, 15, 16, 17, 18, 19, and 20 were removed and placed in the repository by Envirocon. Archeological sites were covered with geotextile fabric and clean fill as Lone Mountain inspected this work as it was performed.

In October, all of remaining contaminated material was removed to the repository. MWH calculated volumes of excavated material from the topographic survey conducted by Envirocon after the removal excavations. The calculated excavated volume of contaminated soil was approximately 136,307 cubic yards from the Site and neighboring properties. This material was placed in the repository. The volume included approximately 112,251 cubic yards of material that was excavated from the area around the mine site, approximately 17,067 cubic yards that was excavated from the neighboring property to the north, and approximately 6,989 cubic yards that was excavated from the neighboring property to the west. The contaminated soil was generally placed in locations on the repository nearest to its point of origin and then spread to accomplish the grading objectives.



Construction of Diversion Channel #2 in December 2012

Following excavation of contaminated soil from the removal areas, a final status survey was conducted at the site to demonstrate that the removal areas no longer contained material in excess of the Ra-226 level of 5.9 pCi/g. The final status survey was conducted by AVM in accordance with Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) guidelines. The final status survey consisted of static gamma surveying, soil sampling and analysis, and development of a revised and more accurate correlation between gamma measurements and equivalent Ra-226 concentrations. An 80-foot triangular grid was randomly generated to provide static survey locations across all of the removal areas except the east drainage area. The survey included 677 one-minute gamma static measurements with a collimated detector and collection and analysis of samples from five percent of the static gamma survey measurement locations. Within the East Drainage area, the final status survey consisted of the results of the ex-situ soil screening conducted during excavation control scanning and results of soil laboratory Ra-226 analyses conducted on samples collected. The final status survey was conducted in stages at each removal area after excavation was deemed complete based on results of the excavation control survey. Backfilling and regrading work was performed in the excavated areas.

The construction of the lower layers of the evapotranspiration cover continued in November. The first twelve-inch-thick layer of the evapotranspiration (ET) cover for the repository was completed using clay loam borrow obtained from the Schmitt Ranch. Construction of Diversion Channels 1 and 2 was also begun. Initial sampling and gradation testing of cover sand in the sheet wash area indicated that the fines content of the sand in the area was less consistent than the design report indicated. MWH conducted additional test pit sampling in November and delineated two new borrow areas where the sandy loam met project specifications. The design was modified to use these borrow areas as detention ponds, and to terminate Diversion Channel 2 in the south retention pond rather than extend the channel to the east arroyo as originally designed.



Applying Seed to Repository with Seed Drill in February 2013

During the month of December, the second twelve-inch-thick layer of the ET cover for the waste repository was completed. The ET cover consisted of sandy loam borrow material from Forest Service administered land. The borrow areas are immediately downslope of the repository and will act as sediment basins to prevent any eroded material from leaving the site. The diversion channels were also completed and lined with rock riprap to prevent erosion. The contractor constructed a test pad of the third layer of the repository that included the 2-inch rock that was blended with sandy loam. The mixing device used was a CAT RM300, which resembles a scraper with mixing paddles.

Work in January of 2013 included the placement of the third and final eighteen-inch-thick layer of the ET cover for the waste repository. This final layer is comprised of a rock admixture that is blended with the sandy loam that will resist erosion and provide a good growth medium for plant life. The plant roots will also aid in preventing erosion and providing transpiration. The flatter top of the repository was constructed with a 2-inch rock gradation. The sides of the repository were at a 20 percent slope and a 3-inch rock mixture was used. MWH computed the in-place volumes of the repository cover soils. The volume of the clay loam layer was 37,944 cubic yards, the sandy loam layer volume was 36,768 cubic yards, and the sandy loam and rock admixture layer was 72,684 cubic yards.



Completed Repository in March 2013

Work in February included construction of temporary range fence and permanent chain link fence by Liberty Fencing. Organic material was added to the revegetated areas using composted green mulch on Forest Service lands and sterile cow manure on adjacent private lands. Seed was applied using seed drills on the majority of the site with hydro seeding methods on steeper slopes. Silt fence was installed along the diversion channels. All construction work was completed, and a final inspection was held on March 8, 2013. The revised Construction Completion Report was approved by the Forest Service on June 27, 2013.

The Unilateral Administrative Order required a minimum five-year operation and maintenance phase to be performed by the companies. The companies initially made inspections every quarter and had their contractor perform any needed repairs. The Forest Service also conducted project reviews and inspections to ensure the terms of the Uniform Administrative Order were being met.

The Forest Service inspected the Site on February 19, 2014, to check on the progress of revegetation and the status of erosion repairs that had been reported previously. The fencing was intact and was in excellent condition. The grass growth was sparse due to a drought. Envirocon had recently repaired a small gulley that had developed the previous September in the borrow area. They had also installed straw bales on several minor erosion rills on the repository itself. In general, site conditions were very good, with the exception of the vegetation, which was very sparse due to drought.



Minor Erosion on North face of Repository in February 2014

The next Forest Service inspection was on May 14, 2015. MWH and Envirocon, hired by the companies, were making erosion repairs to the site on the east side of the repository. Riprap was placed in the gully that had formed along the edge of the repository and coconut matting was also laid to combat further erosion. The chain link fence furnished and installed by Liberty Fencing was being shifted slightly to the east to accommodate this repair work. Disturbed areas were reseeded with native grass.



Moving Chain link Fence in May 2015

There were a large number of Russian Thistle plants at the repository. Small patches of Russian Knapweed plants had previously been discovered in 2014 and treated with a Forest Service approved herbicide that fall. There was a good precipitation pattern in 2015 resulting in lots of grass seedlings throughout the Site.



Repository Vegetation in September 2016

The 2016 inspection was performed by the Forest Service and Stantec, which had acquired MWH. Dwyer Engineering was performing quarterly O&M inspections on the site and Cedar Creek Associates performed their annual revegetation study on September 28th.

Fencing and access gates were in good condition. Erosion repairs that were made in 2015 on the northern and eastern sides of the repository were in good condition. Relocation of the chain link fence on the east side of the site in 2015 had limited the buildup of windblown sediment. The need for additional spraying for Russian knapweed was identified and was performed in October. Results of the 2016 inspection and revegetation evaluation indicated that the site was generally performing well and is meeting the cleanup and performance standards.

The 2017 monitoring inspection was conducted by the Forest Service and Stantec on September 27, 2017. Cedar Creek Associates performed their annual vegetation survey on September 9, 2017. Evidence of winter grazing was reported within the temporary closure area on Dwyer's semi-annual inspection in May. Vegetation had largely recovered by the time of this inspection after good plant growth during the rainy season. Fences and gates were in good shape. The repository area within the chain link fence was not grazed and vegetation continued to improve. The Cedar Creek vegetation survey indicated that the Forest Service portion of the site had achieved the remediation goals while the Lee property was marginally below the revegetation requirement.



Repository Vegetation in September 2018

The 2018 monitoring inspection was held by the Forest Service and Stantec on September 25, 2018. Five years had now elapsed since the Operations and Maintenance Phase officially began with acceptance of the Construction Completion Report and the site was now eligible to be turned over to the Forest Service once all requirements had been met.

Cedar Creek Associates had made their annual vegetation survey the previous week and reported that the vegetation had meet revegetation goals. Some erosion on the lower 200 feet of diversion ditch #2 was noted and repairs will be made to bring it back into compliance. A portion of the access roadway also had eroded and needed some grading work. The temporary fences and gates had served their purpose and their removal was planned in order to open the site to grazing. These repairs were made in the spring of 2019. All requirements of the Unilateral Administrative Order were met by May 2019 and the project was accepted as complete.

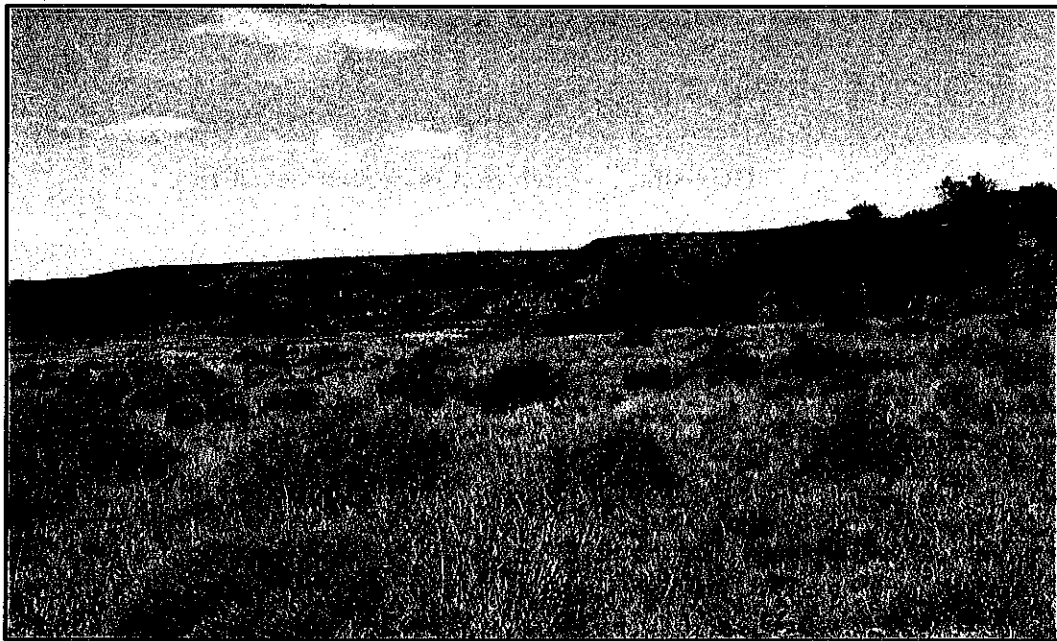
A followup site inspection was conducted five years later on June 22, 2023 to determine if the remedy continued to be protective of human health and the environment. Revegetated areas had improved in size and density to a completely natural appearance. All prior erosion repairs were still in excellent condition. Storm water channels were all in good condition and functioning well. Fencing and gates were all in excellent condition with no signs of vandalism or unauthorized access. The 25 acre repository area will always remain closed to grazing to maximize transpiration and the chain link fence and gates will be kept in perpetuity to exclude cattle and vehicles.

3.0 Effectiveness of the Removal Action

The removal action was carried out in a methodical manner using time-proven techniques. The contractor, Envirocon, was knowledgeable and experienced in performing the work. The work was done safely and effectively.

One concern that had been raised about the evapotranspiration cover during the design phase was its possible susceptibility to burrowing rodents. It was feared that these animals would dig through the cap and bring up radioactive material. While some burrows were noticed outside the fenced repository, no holes were noticed on the repository itself. The high proportion of rock in the top layer of the cover may have been enough to discourage animal burrows as well as minimize erosion.

Removing the waste piles with elevated levels of radionuclides greatly reduced risk to forest visitors from direct contact with radium-226 in waste rock material. The removal action also was very effective in reducing the potential for contaminant transport from contaminant source material to the surrounding environment. The grass and shrub vegetation minimizes soil erosion and ensures that this remedy will be effective for at least the next one hundred years.

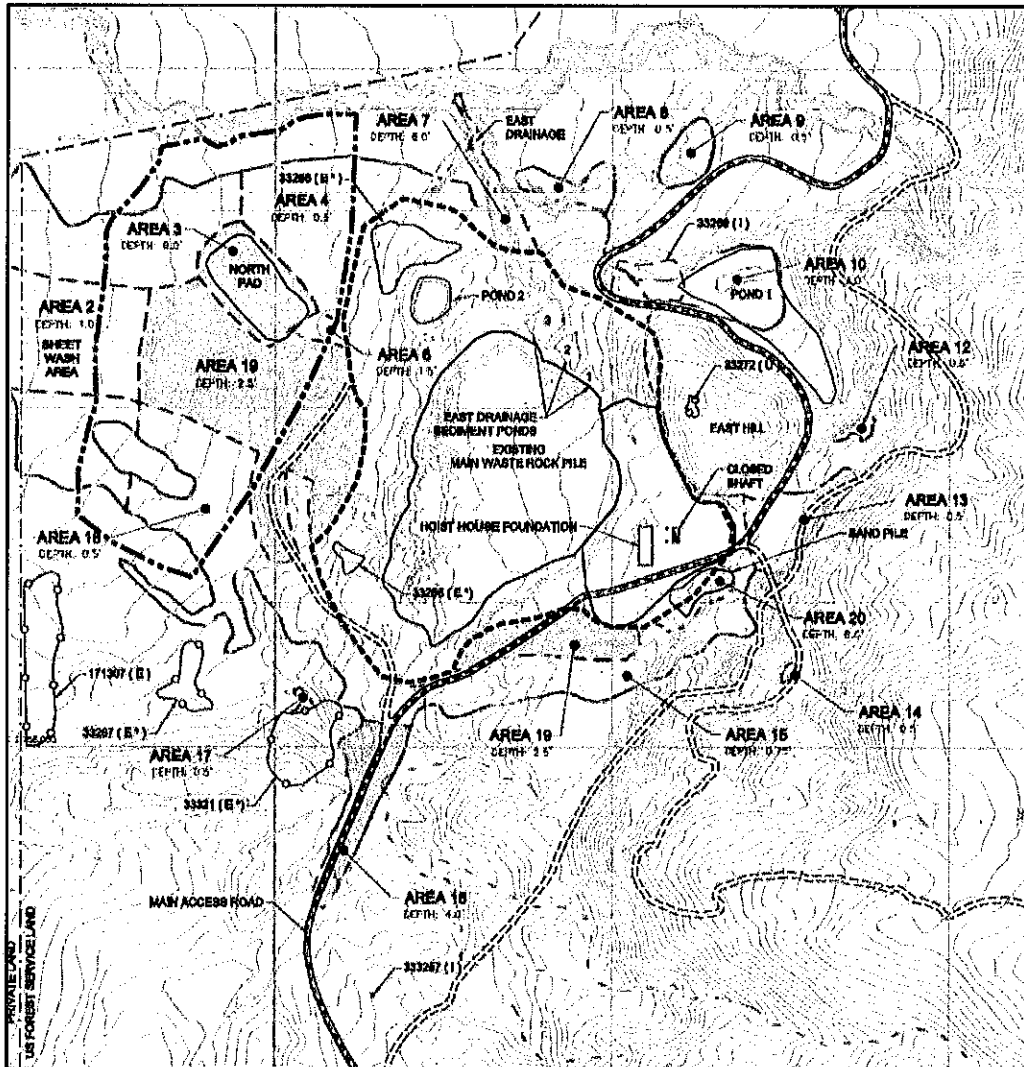


Repository Vegetation in June 2023

4.0 Difficulties Encountered

The main difficulty encountered was with revegetation of the site. Several years of drought combined with unauthorized cattle grazing caused revegetation goals to be met only after five years had passed after construction was completed. Russian Thistle was present in large quantity for the first two years. An infestation of Russian Knapweed also occurred and was ultimately resolved through the use of an approved herbicide.

The chain link fence also unexpectedly caused windblown dirt to accumulate in a several foot high drift at the eastern edge of the repository. This problem was initially solved by moving the fence to a less susceptible location and ultimately by an increased density of vegetation that anchored the soil.



San Mateo Uranium Mine Site Plan

5.0 Recommendations

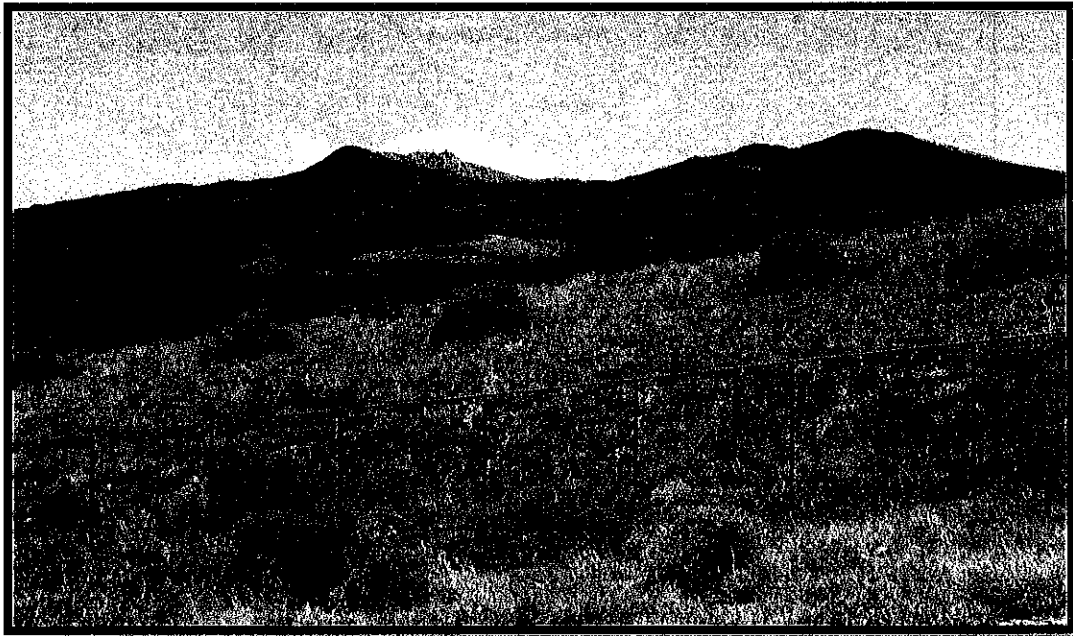
The use of galvanized chain link fence, while effective, gives an industrial and unnatural appearance to the area. It also excludes wildlife and humans. The use of a double rail steel pipe fence gives a more pleasing appearance while still excluding cattle and vehicle use. It is recommended to use double rail steel fencing in future projects where permanent fencing is desired to better blend the repository into the landscape.

The imported gravel placed on the cap of the repository resulted in a very effective erosion control measure while allowing vegetation to gradually emerge. The mixing of the gravel into the soil creates a "desert pavement" where the rocks resist wind and water erosion while the soil provides the matrix until vegetation can become established. It is especially useful in arid areas where revegetation is difficult.

The use of gentle slopes on repositories where space permits is also recommended. The San Mateo Repository was designed with 20% slopes that reduces erosion and allows mixing of gravel in-situ during construction of the cap. It took several years for vegetation to become established but there was virtually no erosion due to the “desert pavement” and gentle slopes.

The evapotranspirative cover system has proven to be efficient and cost-effective where suitable soils are found. Using clay soils, which is popular in the East, is not effective in the arid western states as clay tends to dry out and crack resulting in preferential flow paths. Soils containing silt are most effective for evapotranspiration covers.

The site continues to function well and is protective of human health and the environment. There is no need for maintenance and no further action is planned.



San Mateo Repository has Natural Appearance in 2023