



SEP 11 2025

Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
Albuquerque, NM 87185

NNSA-2025-007665



SEP 18 2025

Mr. JohnDavid Nance
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313

Subject: Submittal of Response to the New Mexico Environment Department Request for Supplemental Information for the *Mixed Waste Landfill Second Five-Year Report*, Sandia National Laboratories, New Mexico, U.S. Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Nance:

The U.S. Department of Energy, National Nuclear Security Administration, Sandia Field Office and National Technology & Engineering Solutions of Sandia, LLC submit the subject document. In a July 17, 2025 letter, the New Mexico Environment Department (NMED) requested supplemental information to assist in responding to the public comments received on the *Mixed Waste Landfill Second Five-Year Report*. The subject document provides the requested supplemental information. Please note that NMED's July 17, 2025, letter mistakenly refers to the *Mixed Waste Landfill Second Five-Year Report* as the *Mixed Waste Landfill Well MWL-MW4 Decommissioning Report*.

If you have any questions, please contact me at (505) 845-6036 or Dr. Adria Bodour of our staff at (505) 845-6930 or adria.bodour@nnsa.doe.gov.

Sincerely,



Daryl J. Hauck, PhD
Manager

cc: See Page 2

SEP 18 2025

cc w/enclosure:

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***Response to the New Mexico Environment Department Request for
Supplemental Information for the Mixed Waste Landfill Second
Five-Year Report***

**Sandia National Laboratories
Albuquerque, New Mexico
EPA ID No. NM5890110518**

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

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Date

Gregory T. Roselle, Ph.D., P.G.

Senior Manager, Defense Waste Management Programs Group
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and



Signature

9/18/2025

Date

Daryl J. Hauck, Ph.D., Manager

U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner



Sandia National Laboratories

Operated for the United States Department of Energy
by National Technology and Engineering Solutions
of Sandia, LLC.

Albuquerque, New Mexico 87185-0101
Livermore, California 94551-0969

Date: October 2025

To: New Mexico Environment Department, Hazardous Waste Bureau

From: U.S. Department of Energy, National Nuclear Security Administration,
Sandia Field Office
National Technology & Engineering Solutions of Sandia, LLC

Subject: Response to the New Mexico Environment Department Request for Supplemental
Information for the *Mixed Waste Landfill Second Five-Year Report*, Sandia National
Laboratories, New Mexico, EPA ID#NM5890110518, HWB-SNL-23-024

INTRODUCTION

The New Mexico Environment Department (NMED) has requested supplemental information to assist in responding to the public comments received on the *Mixed Waste Landfill Second Five-Year Report* (SNL/NM, January 2024) during the June 14 through September 10, 2024 public comment period. This memorandum provides the requested supplemental information, including both the comments verbatim from the NMED request (NMED, July 2025) and the U.S. Department of Energy National Nuclear Security Administration and National Technology & Engineering Solutions of Sandia, LLC responses. Each comment includes several elements; therefore, for organization and clarity, each comment element is numbered (e.g., 1a, 1b, etc.) and addressed separately.

COMMENTS AND RESPONSES

Comment/Response 1

Comment

Discuss the location and activity of nearby fault zones and the Rio Grande Rift in relation to the MWL. Include any known earthquake/seismic activity monitoring in the Albuquerque area by either the Permittee or other entities. Also include a discussion on how the contents of the MWL (containers, etc.) would be affected by average and highest recorded magnitude earthquakes in the Albuquerque area, including settlement and subsidence potential from collapsible containers. In addition, discuss whether seismic activity was included in the risk assessment and/or remedy selection of the MWL.

1a. Discuss the location and activity of nearby fault zones and the Rio Grande Rift in relation to the MWL.

Response

The Mixed Waste Landfill (MWL) is located near the east-central edge of the Albuquerque Basin. The Albuquerque Basin (also known as the Middle Rio Grande Basin) is one of a series of north-south trending basins that was formed during the extension of the Rio Grande Rift. Rift formation began in the late Oligocene and continued into the early Pleistocene, with the primary period of extension occurring between 30 and 5 mega annum, or million years ago. The Rio Grande Rift extends from central Colorado to northern Mexico. While the Rio Grande Rift is associated with faulting and seismic activity, the Albuquerque area has a relatively low seismic hazard compared to other tectonically active regions in the United States.

Table 1 lists the six primary faults on Kirtland Air Force Base (KAFB), including their distances from the MWL and approximate ages. Figure 1 presents the fault locations in relation to the MWL and broader KAFB area. Due to the lack of discernible surface and subsurface expressions or displacement, the fault locations are, in most cases, estimated.

Table 1
Primary Faults on Kirtland Air Force Base

Fault	Distance from MWL (miles)	Age of Fault^a
West Sandia Fault	0.5	Not specified ^b
Sandia Fault	1.6	Late Quaternary (less than 130,000 years)
Tijeras Fault	2.0	Segment on east side of Manzano Base: Late Quaternary (less than 130,000 years) Segment south of Manzano Base: Latest Quaternary (less than 15,000 years)
Hubble Spring Fault	2.8	Latest Quaternary (less than 15,000 years)
Manzano Fault	3.5	Not specified ^b
Coyote Fault	4.2	Middle to Late Quaternary (less than 750,000 years)

Notes:

^aUSGS and New Mexico Bureau of Mines and Mineral Resources. (August 2025). *Quaternary Fault and Fold Database for the United States*, accessed August 2025.

^bThe West Sandia and Manzano Faults are not depicted in the USGS database; therefore, their ages are not specified. These faults were independently mapped by Connell (2006) and Van Hart (June 2003).

MWL = Mixed Waste Landfill

USGS = U.S. Geological Survey

The Sandia, Tijeras, and Hubbell Spring Faults converge near the southeast end of Technical Area-III within the KAFB boundary. This complicated system of faults, which define the eastern edge of the Albuquerque Basin, are collectively referred to as the Tijeras Fault Complex. The MWL is located between the inferred West Sandia Fault to the north and the Tijeras Fault Complex to the east and southeast.

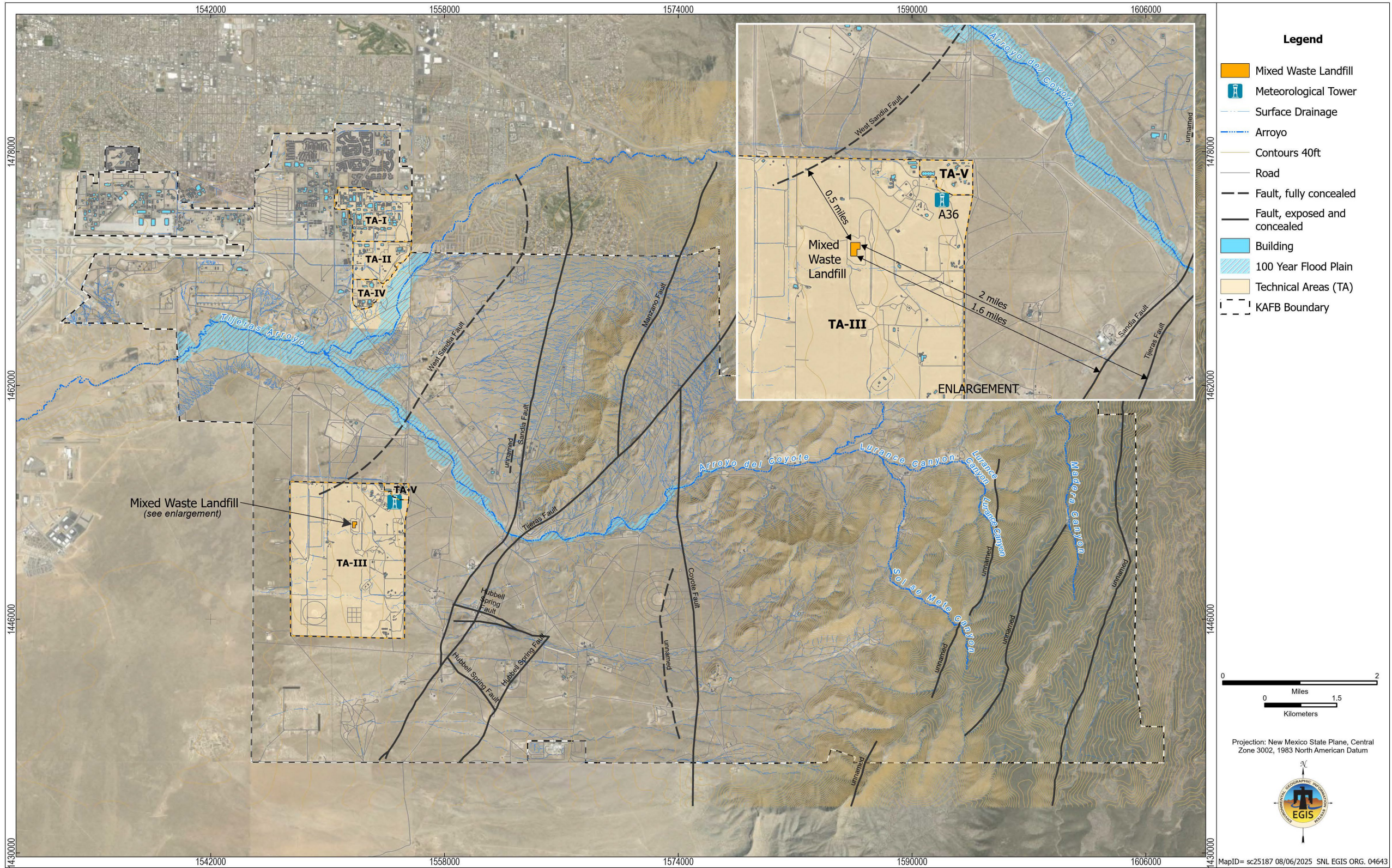


Figure 1
Fault Locations in Relation to the Mixed Waste Landfill and Kirtland Air Force Base

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1b. Include any known earthquake/seismic activity monitoring in the Albuquerque area by either the Permittee or other entities.

Response

Seismic activity in the Albuquerque area is monitored by the U.S. Geological Survey (USGS) and the New Mexico Bureau of Geology and Mineral Resources. Sandia National Laboratories, New Mexico (SNL/NM) does not maintain independent seismic monitoring systems and therefore relies on regional data provided by the USGS and the New Mexico Bureau of Geology and Mineral Resources.

Since 1893, 120 earthquakes (ranging in magnitude from 2.5 to 5.2) have occurred within an approximately 150-mile radius of the MWL (USGS and New Mexico Bureau of Mines and Mineral Resources, August 2025); however, none of the epicenters (i.e., points on the earth's surface directly above where the earthquakes originated) were within the KAFB boundary. The closest earthquake occurred in Albuquerque, approximately 10 miles from the MWL, on January 4, 1971 and had a magnitude of 4.7 on the Richter scale. SNL/NM buildings did not sustain any appreciable damage from this earthquake (DOE, October 1999).

1c. Also include a discussion on how the contents of the MWL (containers, etc.) would be affected by average and highest recorded magnitude earthquakes in the Albuquerque area, including settlement and subsidence potential from collapsible containers.

Response

The MWL contains solid waste materials encased in containers. Some of the containers (i.e., polyethylene bags, fiberboard drums, cardboard boxes, steel drums) are susceptible to degradation over time. Routine operational waste such as personal protective equipment, laboratory waste, decontamination waste, etc., was typically disposed of in such containers. Radiological sources were sealed in lead and/or concrete casks, which are less susceptible to degradation. Before the engineered Evapotranspirative (ET) Cover subgrade was placed, low spots in the existing site surface and disposal pits with void space were filled and compacted to minimize the potential for settlement from the overlying weight of the cover and subsidence from the collapsible containers (SNL/NM, June 1998).

The projected effects of seismic activity in the Albuquerque area on the contents of the MWL are as follows:

- Average Magnitude Earthquake (e.g., magnitude less than 4.0): Such an earthquake would be unlikely to cause significant settlement of the ET Cover or subsidence of the contents from movement or compaction.
- Highest Recorded Magnitude Earthquake: A magnitude 5.2 earthquake could potentially cause minor settlement of the ET Cover and subsidence of the contents. However, the ET Cover is designed to accommodate minor shifts in subsurface conditions with little or no effect on itself or the contents.

The site response to and damage from an earthquake are difficult to determine, as other factors such as the location of the epicenter and depth of the earthquake, ground displacement, rupture patterns, and ground accelerations must be considered. However, the ET Cover design is a “soft cover” design (i.e., no liners or leachate collection systems) that is resilient to minor seismic activity and minimizes containment integrity issues. Additionally, the solid nature of the waste, very high evapotranspiration rate, and thick vadose zone (i.e., unsaturated sediments between the surface and top of the Regional Aquifer) further minimize the probability of waste migration due to minor seismic activity.

1d. In addition, discuss whether seismic activity was included in the risk assessment and/or remedy selection of the MWL.

Response

Seismic activity was not included in the MWL human health and ecological risk assessment, which was presented in the *Mixed Waste Landfill Corrective Measures Study Final Report* (SNL/NM, May 2003) for the various remedial alternatives. The purpose of a Resource Conservation and Recovery Act human health and ecological risk assessment is to help identify releases of hazardous waste and whether corrective action is required, determine exposure pathways (e.g., soil, air, groundwater), and assess the toxicity of the hazardous waste. Therefore, the MWL human health and ecological risk assessment was based on contaminant concentrations obtained from environmental media samples collected from the MWL. It did not consider risk posed by constituents present in the MWL inventory that have not been released into the environment or environmental conditions (e.g., flooding, climate variation over time, earthquakes) that may affect the site. It was, however, conservative in that it assessed direct exposure to the highest contaminant concentrations at any depth interval.

While the MWL is a solid waste management unit that does not currently or historically meet the definition of a new hazardous waste treatment, storage, or disposal facility, it does meet the seismic considerations cited in 20.4.1.500 NMAC, incorporating 40 CFR Section 264.18(a)(2):

No faults or fault traces with Holocene (i.e., within the last 10,000 to 12,000 years) displacements are located within 200 feet of the site.

Additionally, the MWL is not a high-risk structure, such as a nuclear reactor facility; therefore, a probabilistic seismic hazard analysis was not required to construct the ET Cover. As addressed in this comment response, seismic activity is not a primary concern based on the location of the MWL.

Comment/Response 2

Comment

NMED is aware that climate change was considered during remedy selection, as discussed in the report entitled, Probabilistic Performance-Assessment Modeling of the Mixed Waste Landfill at Sandia National Laboratories (2nd Edition), and Calculation Set for Design and Optimization of Vegetative Soil Covers, and when establishing the requirements for monitoring under the LTMMP. Discuss the effects of climate on the ET cover, both through 2014 through current time, and the effect of climate change to the ET cover in the future, which may include more extreme storm events.

2a. NMED is aware that climate change was considered during remedy selection, as discussed in the report entitled, Probabilistic Performance-Assessment Modeling of the Mixed Waste Landfill at Sandia National Laboratories (2nd Edition), and Calculation Set for Design and Optimization of Vegetative Soil Covers, and when establishing the requirements for monitoring under the LTMMP. Discuss the effects of climate on the ET cover, both through 2014 through current time, ...

Response

Strong precipitation events have been observed infrequently since ET Cover construction was completed (2009) and the *Long-Term Monitoring and Maintenance Plan for the Mixed Waste Landfill* (LTMMP) (SNL/NM, March 2012, as modified) was implemented (2014). From 1995 through 2019, the 24-hour maximum observed precipitation at SNL/NM Meteorological Tower A36 (Figure 1), located 3,000 feet from the MWL, was 2.56 inches. This maximum represents the August 2006 precipitation event that caused breaches of the temporary soil berm constructed around the site during subgrade preparation (see the response to Comment 3a). ET Cover maintenance activities performed from 2009 through 2011 are documented in LTMMP Appendix B. No ET Cover maintenance activities or repairs related to precipitation events were needed or performed from 2009 through 2011; only maintenance activities designed to promote native grass growth on the ET Cover (i.e., supplemental watering and weed removal activities) were performed during that period.

From 2010 through 2012, meteorological conditions were dry, with below average precipitation. As documented in the *Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, January-March 2014* (SNL/NM, June 2014), despite these conditions, the ET Cover met the LTMMP criteria for successful revegetation (LTMMP Section 4.1). Minor best practice repairs were performed in August and November 2013 (SNL/NM, June 2014) to fill in erosional rills (i.e., small shallow channels that formed on the soil due to concentrated runoff) on the northern and western side slopes that resulted from strong monsoonal storms in July and September 2013. These small rills were 1 to 3 inches deep and did not exceed the LTMMP criteria for maintenance or repair (i.e., erosion exceeding 6 inches deep) but were noted during site inspections. While the repair work was performed before the LTMMP was approved (NMED, January 2014), it followed all LTMMP requirements. Weed removal activities were also performed in 2013 (SNL/NM, June 2014).

No subsidence has been observed on the ET Cover surface, and since 2014, the required quarterly ET Cover and site inspections have documented only minor localized erosion that has not exceeded the LTMMP criteria for maintenance or repair. Minor erosion mitigation activities (see the response to Comment 3b) have been performed as a best practice to minimize future ET Cover maintenance and are documented in the MWL annual long-term monitoring and maintenance reports. Since LTMMP implementation (2014), all monitoring and inspection results have demonstrated that the ET Cover is performing as designed, with no significant erosion or subsidence observed, and remains protective of human health and the environment.

2b. ...and the effect of climate change to the ET cover in the future, which may include more extreme storm events.

Response

Long-term average precipitation (30-year norm based on 1991-2020 data) at the Albuquerque International Sunport is 8.84 inches per year. Long-term average precipitation (1995-2019) at Meteorological Tower A36 (Figure 1) is 8.86 inches per year. Between 2014 and 2024, the annual precipitation at this tower ranged from 11.34 inches (2018) to 6.21 inches (2024). However, since 2014, the local climate has generally been characterized by below average precipitation and warmer than average temperatures.

Climate change projections for the Albuquerque area suggest an increase in extreme weather events, including higher temperatures, prolonged droughts, and more intense rainfall events. These changes could affect the ET Cover in the following ways:

- **Vegetation Stress:** Higher temperatures and reduced precipitation could stress the vegetation, potentially reducing transpiration efficiency.
- **Erosion Risk:** Intense rainfall events could increase the erosion risk, particularly if the vegetation is compromised.
- **Infiltration Potential:** Prolonged droughts followed by heavy rainfall could alter soil properties, potentially increasing infiltration rates.

For protection of human health and the environment, controls are built into the LTMMP to ensure that the ET Cover meets its design specifications and performance requirements (e.g., foliar coverage of native vegetation, no subsidence or erosion exceeding 6 inches) now and in the future. The ET Cover is inspected quarterly, with any required maintenance or repairs addressed according to the schedule provided in LTMMP Section 4.6, Table 4.6-1. Additionally, local meteorological conditions and their effects on native vegetation and ET Cover performance are monitored throughout the year. These conditions and their effects are documented in the required Biology Report included in each MWL annual long-term monitoring and maintenance report. The LTMMP controls are enforceable through the *Resource Conservation and Recovery Act Hazardous Waste Facility Operating Permit for Sandia National Laboratories*, EPA ID No. NM5890110518 (RCRA Permit) (NMED, January 2015, as modified) and ensure that any adverse effects on the ET Cover and/or surrounding site drainage features from future climate change and/or extreme weather events are mitigated in a timely manner and documented in reports submitted to the NMED.

Comment/Response 3

Comment

Severe rainfall events can and have previously occurred at the location of the MWL. Heavy rainfall and a pooling effect was identified as causing berm destruction at the MWL. Include a description of berm destruction at the MWL and documents where the berm destruction was documented. Also describe maintenance activities that have occurred that will prevent subsidence due to large stormwater events in the future.

3a. Severe rainfall events can and have previously occurred at the location of the MWL. Heavy rainfall and a pooling effect was identified as causing berm destruction at the MWL. Include a description of berm destruction at the MWL and documents where the berm destruction was documented.

Response

In 2006, a temporary soil berm was constructed around the perimeter of the MWL as part of the site-specific Stormwater Pollution Prevention Plan (SWPPP) activities to support the ET Cover construction project. The focus of the SWPPP was to minimize pollutants in stormwater by controlling the volume of stormwater run-on/run-off and reducing soil erosion during construction activities. In addition to the SWPPP, a Notice of Intent was prepared for the ET Cover construction project and was submitted to the U.S. Environmental Protection Agency (i.e., the regulatory authority) in May 2006 for coverage under the National Pollution Discharge Elimination System Construction General Permit.

The ET Cover was deployed in two phases. The temporary soil berm was constructed to support the first phase, which was completed in 2006. The first phase included the following activities:

- June through July 2006: Soil excavation and screening activities at the MWL Borrow Pit located approximately 1.2 miles south of the MWL in Technical Area-III.
- October through December 2006: Subgrade preparation at the MWL.

The temporary soil berm was constructed according to the SWPPP specifications and generally performed as designed, limiting the release of sediment and surface water from the construction site. The breaches of the temporary soil berm occurred in August 2006, before subgrade preparation had begun. These localized breaches were caused by a strong monsoonal storm that dropped approximately 2.6 inches of rain within approximately 2.5 hours on August 16, 2006. Of note, according to the National Weather Service, the 2006 monsoon season (July-September 2006) was the wettest monsoon season on record in Albuquerque. Meteorological Tower A36 (Figure 1) recorded approximately 6 inches of rain in August 2006.

The intensity of the August 16, 2006 monsoonal storm over a short time caused rainwater to accumulate rapidly on the surface and follow the topography. The surface water followed the perimeter road that intersected the temporary soil berm immediately north and east of the MWL. The surface water breached the soil berm there and flowed west along a topographically low area on the north side of the MWL, however did not flow across the MWL (i.e., surface of the disposal areas), which was topographically higher. The surface water accumulated behind the soil berm along the west side of the MWL (topographically downgradient side) and eventually

breached the soil berm there in a small localized area. After breaching the soil berm in that area, the surface water flowed west for approximately 45 yards along the two-track MWL-MW6 access road. The soil berm was subsequently repaired and continued to perform as designed, with no other breaches or significant damage. This soil berm event is documented in internal communications and SWPPP-required inspection and maintenance records.

As part of the ET Cover design, a perimeter engineered stormwater diversion swale was installed as a permanent erosion and surface water control feature. The stormwater diversion swale is an important component of the final site conditions. It diverts stormwater around the ET Cover, reducing the potential for cover erosion from severe stormwater events such as the August 16, 2006 monsoonal storm. It is inspected and maintained quarterly in accordance with LTMMP requirements.

3b. Also describe maintenance activities that have occurred that will prevent subsidence due to large stormwater events in the future.

Response

There have been no indications of subsidence in the 16 years since the ET Cover construction and stormwater diversion swale installation were completed. The ET Cover (including the gentle cover surface slope and side slopes), stormwater diversion swale, and post-ET Cover topography and vegetation work together to prevent stormwater from eroding the cover and to reduce the amount of water that infiltrates through the cover. As discussed previously, the ET Cover and stormwater diversion swale are inspected quarterly in accordance with LTMMP requirements. The inspection results are documented on the site inspection forms and in the MWL annual long-term monitoring and maintenance reports. Specifications and criteria are set in LTMMP Chapter 4, Table 4.6-1 for parameters such as evidence of erosion, subsidence, and ponding of water on the ET Cover surface. If any of these parameters exceed LTMMP criteria, repair to conditions consistent with the original design must be performed within 60 days. Quarterly inspections and maintenance/repairs (if needed) are required and enforceable for the foreseeable future under the RCRA Permit.

Several best practice improvements, which are documented in *the Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, April 2016-March 2017* (SNL/NM, June 2017), added surface water controls that direct surface water flow away from the ET Cover and site with minimal to no erosional impacts. These best practice improvements include:

- Erosion and animal burrowing controls (i.e., rock-filled Gabion baskets and Reno blankets) installed at perimeter monitoring wells from September through November 2016.
- Perimeter road improvements completed from November 2016 to February 2017.

Since LTMMMP implementation (2014), minor erosion mitigation activities have been performed as a best practice (i.e., erosion has not exceeded the LTMMMP criteria for maintenance or repair) to minimize future ET Cover maintenance. These activities are described below.

- Minor erosion along the two-track MWL-MW4 access road, which is located on the northern slope of the ET Cover, was repaired, as were small eroded areas on the northwest slope of the ET Cover. Both activities were performed in October 2018 and are documented in the *Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, April 2018-March 2019* (SNL/NM, June 2019).
- Rills that had formed along the two-track MWL-MW4 access road were filled in with sediment from the road. After the rills were filled in, local gravel was used to armor the tracks against future erosion. Both activities were performed in July 2025 and will be documented in the upcoming MWL annual long-term monitoring and maintenance report for the April 2025-March 2026 reporting period. Of note, the two-track MWL-MW4 access road will be used less frequently now that monitoring well MWL-MW4 is decommissioned and no longer requires quarterly water level measurements.

Quarterly inspections and maintenance/repairs (if needed) will continue and will be documented in the MWL annual long-term monitoring and maintenance reports in accordance with LTMMMP requirements. These inspections and maintenance/repair activities are enforceable through the RCRA Permit.

Summary and Conclusion

The ET Cover is designed to minimize infiltration of precipitation, reduce erosional damage caused by surface water run-on/run-off, and promote evapotranspiration. The design includes native vegetation, which both stabilizes the ET Cover surface and side slopes and removes excess soil moisture via photosynthesis and transpiration. The gentle slope of the ET Cover and stormwater diversion swale directs surface water off and around the cover, minimizing erosion and infiltration. The design is resilient to climate change and historical seismic activity. There have been no indications of settlement or subsidence since ET Cover construction was completed (2009).

MWL remedy controls are implemented and maintained to provide the information needed to determine if the ET Cover is performing as designed and to confirm that site conditions remain protective of human health and the environment. They consist of physical, active, and administrative controls that are defined in the LTMMMP and are enforceable through the RCRA Permit. They include the ET Cover and slope; stormwater diversion swale; perimeter security fence and signage; survey monuments; multimedia monitoring and trigger level requirements; inspection, maintenance, and repair requirements; and land use restrictions (i.e., maintain industrial land use and do not allow disturbance of the ET Cover).

The MWL remedy controls represent safeguards that are implemented in an integrated and layered approach to ensure the long-term protection of human health and the environment. Inspection, maintenance, repair, and performance of these controls are documented in the MWL annual long-term monitoring and maintenance reports submitted to the NMED in June of each year and available to the public.

References

- Connell, S. D. (2006). *Preliminary Geologic Map of the Albuquerque-Rio Rancho Metropolitan Area and Vicinity, Bernalillo and Sandoval Counties, New Mexico*, New Mexico Bureau of Geology and Mineral Resources, Open-File Report 496.
- New Mexico Environment Department. (January 2014). *Approval, Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan, March 2012, Sandia National Laboratories, EPA ID# NM5890110518, HWB-SNL-12-007* [January 8, 2014 letter from T. Blaine, New Mexico Environment Department, Hazardous Waste Bureau to G. Beausoleil, U.S. Department of Energy, National Nuclear Security Administration, Sandia Site Office and P.B. Davies, Sandia National Laboratories, New Mexico].
- New Mexico Environment Department. (January 2015, as modified). *Resource Conservation and Recovery Act Hazardous Waste Facility Operating Permit for Sandia National Laboratories, EPA ID No. NM5890110518*.
- New Mexico Environment Department. (July 2025). *Request for Supplemental Information, Mixed Waste Landfill Well Second Five-Year Report, Sandia National Laboratories, New Mexico, EPA ID#NM5890110518, HWB-SNL-23-024* [July 17, 2025 letter from JD Nance, New Mexico Environment Department, Hazardous Waste Bureau to D. Hauck, U.S. Department of Energy, National Nuclear Security Administration, Sandia Field Office and G. Roselle, Sandia National Laboratories, New Mexico].
- New Mexico Environmental Improvement Board. (December 2018). *Adoption of 40 CFR Part 264, 20.4.1.500 NMAC*.
- Sandia National Laboratories, New Mexico. (June 1998). *Responses to NMED Technical Comments on the Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation Dated September 1996, Volume 1*.
- Sandia National Laboratories, New Mexico. (May 2003). *Mixed Waste Landfill Corrective Measures Study Final Report*.
- Sandia National Laboratories, New Mexico. (March 2012, as modified). *Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan*.
- Sandia National Laboratories, New Mexico. (June 2014). *Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, January 2014 – March 2014*.
- Sandia National Laboratories, New Mexico. (June 2017). *Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, April 2016 – March 2017*.
- Sandia National Laboratories, New Mexico. (June 2019). *Mixed Waste Landfill Annual Long-Term Monitoring and Maintenance Report, April 2018 – March 2019*.
- Sandia National Laboratories, New Mexico. (January 2024). *Mixed Waste Landfill Second Five-Year Report*.

U. S. Department of Energy. (October 1999). *Final Site-Wide Environmental Impact Statement for Sandia National Laboratories/New Mexico*, DOE/EIS-0281.

U.S. Geological Survey and New Mexico Bureau of Mines and Mineral Resources. (August 2025). *Quaternary Fault and Fold Database for the United States*, accessed August 2025. https://www.usgs.gov/natural-hazards/earthquake-hazards/faults?qt-science_support_page_related_con=4#qt-science_support_page_related_con, accessed 4 October 2021, image excerpt obtained from the “Interactive fault map” link to <https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aaddf88412fcf>.

Van Hart, D. (June 2003). *Geologic Investigation: An Update of Subsurface Geology on Kirtland Air Force Base, New Mexico*, SAND2003-1869.

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