Department of Energy
National Nuclear Security Administration
Sandia Field Office
P.O. Box 5400
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NMED
Hazardous Waste
Bureau

Mr. John E. Kieling
Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Dr. East, Bldg 1
Santa Fe, New Mexico 87505

Subject: Submittal of Mixed Waste Landfill (MWL) Five-Year Report, January 2019, in accordance with the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) for Sandia National Laboratories/New Mexico, Environmental Protection Agency Identification Number NM5890110518

Dear Mr. Kieling:

The Department of Energy/National Nuclear Security Administration and National Technology and Engineering Solutions of Sandia, LLC are submitting the enclosed MWL Five-Year Report, dated January 2019, to the New Mexico Environment Department (NMED). This document fulfills the reporting requirements for the NMED May 2005 and February 2016 Final Orders, as well as Section 4.8.2 of the MWL LTMMP.

The report includes a summary of monitoring, inspection, and maintenance results for the first four calendar years under the LTMMP (January 2014 through December 2017) Additionally, it contains details on actions taken by SNL to prevent, and if necessary, mitigate any future release or movement of contaminants, an update to the MWL fate and transport model, an evaluation of the effectiveness of the selected remedy, and feasibility evaluations of MWL excavation with both offsite and onsite disposal alternatives are also provided in accordance with NMED Final Order requirements.

If you have questions contact David Rast, of our staff, at (505) 845-5349.

Sincerely,

Jeffrey P. Harrell
Manager

Enclosure

cc: See Page 2

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NNSA-2018-003643

Submittal of Updated Reference Document Cited in the Mixed Waste Landfill Long-Term Monitoring and Maintenance Plan January 2019

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.

Paul E. Shoemaker, Senior Manager
R & D Science and Engineering
National Technology & Engineering Solutions of Sandia LLC
Albuquerque, New Mexico
Operator

12/5/2018
Date signed

Jeffrey P. Harrell, Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Field Office
Owner

12/14/18
Date signed

Sandia National Laboratories

MIXED WASTE LANDFILL FIVE-YEAR REPORT

SANDIA NATIONAL LABORATORIES, NEW MEXICO LONG-TERM STEWARDSHIP

JANUARY 2019

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

United States Department of Energy
Sandia Field Office

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MIXED WASTE LANDFILL
FIVE-YEAR REPORT

Facility: Mixed Waste Landfill

Location: Sandia National Laboratories
Albuquerque, New Mexico

EPA ID No.: NM5890110518

Permit Basis: SNL/NM RCRA Facility Operating Permit, Attachment M
New Mexico Environment Department Final Orders:

- *In the Matter of Request for a Class 3 Permit Modification for Corrective Measures for the Mixed Waste Landfill,* No. HWB 04-11(M) (May 2005)
- *In the Matter of Proposed Permit Modification for Sandia National Laboratories EPA ID No. NM5890110518 to Determine Corrective Action Complete with Controls at the Mixed Waste Landfill*, No. HWB 15-18 (P) (February 2016)

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EXECUTIVE SUMMARY

In the May 2005 Final Order, the New Mexico Environment Department (NMED) selected a vegetative soil cover with a biointrusion barrier (i.e., evapotranspirative [ET] cover) as the remedy for solid waste management unit (SWMU) 76, Mixed Waste Landfill (MWL), and established the requirement for a five-year report. This is the first MWL Five-Year Report. The May 2005 Final Order on remedy selection, the February 2016 Final Order on corrective action complete status (NMED May 2005; February 2016), and Section 4.8.2 of the MWL Long-Term Monitoring and Maintenance Plan (LTMMP) (SNL/NM March 2012) establish and delineate the report requirements. As determined by the NMED (Kieling October 2011), the first five-year evaluation period began on January 8, 2014 when NMED approved the LTMMP (Blaine January 2014). In accordance with the LTMMP, this report includes monitoring, inspection, and maintenance results for the first four calendar years under the LTMMP, 2014 through 2017. Subsequent Five-Year Reports will cover a full five-year period.

The MWL is a 2.6-acre SWMU located in the north-central portion of Technical Area-III approximately four miles south of Sandia National Laboratories/New Mexico (SNL/NM) central facilities and five miles southeast of the Albuquerque International Sunport. The MWL was used as a disposal area for low-level radioactive waste, hazardous waste, and mixed waste generated at SNL/NM research facilities and offsite locations from March 1959 to December 1988. The MWL has undergone corrective action and as effective on March 13, 2016, is Corrective Action Complete with Controls (NMED February 2016). All controls required for the MWL are defined in the MWL LTMMP, which is included in Attachment M of the SNL/NM Resource Conservation and Recovery Act (RCRA) Facility Operating Permit (Permit) (NMED January 2015 and Kieling February 2016). Long-term monitoring, maintenance, and reporting are conducted in accordance with the Permit (NMED January 2015, with all approved modifications).

The primary purpose of the Five-Year Report is to evaluate the effectiveness of the selected remedy (i.e., the ET Cover) and the likelihood of contaminants reaching groundwater. The 2014 through 2017 monitoring, inspection, and maintenance results provide the empirical data necessary to establish current site conditions, evaluate the effectiveness of the ET Cover and associated controls, and reevaluate the likelihood of contaminants reaching groundwater. The measure of effectiveness is the protection of human health and the environment.

Based upon four years of monitoring, inspection, and maintenance under the LTMMP, MWL site conditions have improved and continue to be protective of human health and the environment. ET Cover native vegetation has matured and additional best practice measures to reduce erosion and control site drainage have been completed. MWL multi-media monitoring results are consistent with historical data, no trigger levels were exceeded, and there were no indications of new releases or changing conditions that would increase the risk to site workers, the public, or increase the likelihood of contaminants reaching groundwater.

The MWL ET Cover and associated remedy controls are in good condition and performing as designed. The inspection and maintenance results confirm the physical integrity of the ET Cover, site controls, and all monitoring networks. ET Cover maintenance and repairs have decreased over this reporting period as a result of successful revegetation efforts, routine and best practice maintenance, and ET Cover and site improvements (Figure ES-1).

View looking west of the Evapotranspirative Cover

View looking southeast of Monitoring Well MWL-MW8
Western side slope erosion and burrow control improvements
Passive venting BaroBall™ device installed on wellhead

View looking south of western perimeter road
Road ditches and culvert improvements to perimeter drainage

Figure ES-1
Photographs of the Mixed Waste Landfill in Late July 2018

Fate and transport modeling updates were not required based on a comparison of the 2014 through 2017 monitoring results to the previous 2005 modeling. However, the volatile organic compound (VOC) soil-vapor plume model was updated with recent 2014 through 2017 monitoring results to develop a better understanding of plume migration and to reevaluate the likelihood of contaminants reaching groundwater. The updated, simplistic model that conservatively maximizes transport to groundwater predicts VOC soil-vapor concentrations will continue to decrease over time and are unlikely to impact groundwater.

Another Five-Year Report requirement is to reevaluate the feasibility of MWL excavation by updating the *Complete Excavation with Offsite Disposal* remedial alternative originally evaluated in the MWL Corrective Measures Study (CMS) Final Report (SNL/NM May 2003). This requirement was expanded by the February 2016 NMED Final Order to include an evaluation of onsite disposal in a modern landfill that includes a RCRA Subtitle C liner system. This was the only modification to the May 2005 Final Order requirements and is specific to the first Five-Year Report. The evaluation of onsite disposal in a modern landfill was not addressed in the MWL CMS Final Report.

The 2018 excavation feasibility evaluation updates the 2003 evaluation and includes both the offsite and onsite disposal alternatives. Advances in technology since 2003 have not fundamentally changed the excavation and waste management approach. However, radiological decay, use of a more conventional excavation approach, and a streamlined waste management approach represent significant changes. In addition, long-term onsite storage of excavated waste was eliminated for the 2018 evaluation because there are current disposal pathways for all anticipated waste streams.

Complete excavation with offsite and onsite disposal are remedial alternatives that could be implemented, if necessary. There is no short-term risk reduction with excavation remedies as current conditions are protective of human health and the environment. Long-term risk is mitigated by ongoing monitoring and the LTMMP trigger level process. The overall health and safety risk to site workers for the excavation alternatives is high due to the nature of the waste, the complexity and duration of the work, and the risk of physical injury and death associated with remediation construction and transportation hazards. These factors, along with classified waste security requirements and the extensive support facilities required for excavation and waste management, result in substantial technical challenges and a high cost of implementation for both alternatives. MWL excavation and waste management inherently involves significant construction and transportation risk.

MWL site conditions continue to be protective of human health and the environment with multi-media monitoring, inspection, and maintenance/repair safeguards. The monitoring trigger level process provides early warning of changing conditions and requires timely follow-up if a trigger level is exceeded. This process ensures that any future releases or movement of contaminants would be detected and addressed before any detrimental effect on groundwater or increased risk to public health. Best practice measures and follow-up field investigations are being used to improve and better understand site conditions, and plan future actions to protect groundwater, if necessary. This protective approach for the MWL is established in the Permit through the incorporation of the LTMMP in Attachment M. Annual LTMM and Five-Year reporting make all information available to the public. LTMMP monitoring parameters and frequencies have been evaluated as part of this Five-Year reporting effort; no changes are needed for the protection of human health and the environment.