



MWL



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May 8, 2015

DCN: NMED-2015-07

Mr. David Cobrain  
NMED - Hazardous Waste Bureau  
2905 Rodeo Park Dr. East  
Building One  
Santa Fe, NM 87505

RE: Draft Responses to Public Comments Regarding the Final Cover Placed on the Mixed Waste Landfill (MWL), Sandia National Laboratory (SNL)

Dear Mr. Cobrain:

Attached please find draft responses to public comments regarding the final cover placed on the Mixed Waste Landfill (MWL) at Sandia National Laboratory (SNL), located near Albuquerque, New Mexico. These comments were prepared under a subcontract by Ms. Cathy Dare with TRM Environmental Consultants, LLC.

If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at [paigewalton@msn.com](mailto:paigewalton@msn.com).

Thank you,

A handwritten signature in cursive script that reads "Paige Walton".

Paige Walton  
AQS Senior Scientist and Program Manager

Enclosure

cc: Will Moats (NMED) (electronic)  
Cathy Dare, TRM (electronic)  
Joel Workman, AQS (electronic)

**Draft Responses to Public Comments Regarding the Final Cover Placed on the Mixed Waste Landfill (MWL)  
Sandia National Laboratory (SNL)**

| <b>Comment No.</b>    | <b>Commenter</b>  | <b>Reference (Section)</b> | <b>Comment</b>  | <b>Response</b>   |
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| 1<br>NMED ID:<br>LLLL | Eric Nuttall, Ph.D.   | Comment<br>No. 3           | A commenter stated that the dirt cover cannot last for any reasonable period of time as protection against the radioactive and hazardous wastes disposed of in the [mixed waste landfill] MWL.  | The May 2003 Mixed Waste Landfill (MWL) Corrective Measures Study (CMS) Final Report indicates in the Risk Assessment in Appendix I that risks without any additional actions taken were protective of human health and the environment.  |
| <i>AND</i>            | <i>AND</i>  | <i>AND</i>                 | <i>AND</i>  | In order to prevent any further migration of landfill hazardous constituents via infiltration, a RCRA compliant cover was constructed consisting of a compacted subgrade, a rock biointrusion layer and thin soil cover, a compacted native soil layer, and a topsoil layer.  |
| NMED ID:<br>MMMM      | Citizen Action New Mexico (CANM)<br><br>Concerned Citizens for Nuclear Safety (CCNS)<br><br>Robert Gilkeson, P.G. | Comment<br>No. 72          | A commenter stated that the dirt cover [which] was installed in 2009 is not a Resource Conservation and Recovery Act (RCRA) compliant cover. The cover offers no real protection for the period of time necessary to protect against erosion due to run-on/run-off [and is unlikely] to maintain its integrity. | The cover averages 4.12 feet thick (or 1255.8 mm, which is in addition to the 1.25-foot thickness of the bio-barrier and up to 3 additional feet of subgrade). At an average erosion rate of 1 mm per year, the cover would last more than 1,000 years even if no maintenance was performed to replace soil eroded from the cover.<br><br>The cover was designed and constructed to last 1,000 years. It is reasonable to assume that the government will continue to exist for the next 1,000 years and will continue to be responsible for the maintaining the constructed cover.<br><br>The cover was designed to become assimilated with the surrounding environment so as to require |

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|                       |                     |                   |  | <p>little to no maintenance over its 1,000 year design life.</p> <p>The landfill surface has been graded to minimize erosion potential due to surface water runoff. The landfill cover footprint extends beyond the lateral limits of the MWL. Ditches have been constructed to divert surface water run-on further reducing potential infiltration.</p> <p>The cover surface is vegetated and the vegetation further reduces erosion potential.</p> <p>The current evapotranspirative cover allows for moisture to be stored and then returned to the atmosphere by evaporation. Also, the soil serves as a reservoir for plants, which extract the stored water from the soil during the growing season and return it to the atmosphere. The cover is designed to prevent precipitation from reaching the wastes beneath the cover, thereby preventing further migration of landfilled wastes.</p> <p>As constructed and designed, the evapotranspirative cover is expected to last at least 1,000 years. Monitoring under the LTMMMP will ensure that the cover is functioning as intended.</p> |
| 2<br>NMED ID:<br>LLLL | Eric Nuttall, Ph.D, | Comment<br>No. 21 | A commenter stated that the dirt cover that was placed above the MWL wastes was improperly constructed because it lacks an impermeable liner to carry moisture away and to the sides of the MWL. . . . Dirt covers | The MWL Corrective Measures Implementation Report, dated January 2010 documents that the evapotranspirative cover was constructed in accordance with the requirements, specifications, and design drawings presented in the November 2005 MWL Corrective Measures Implementation Plan. The thickness of the cover components in most instances exceeded the required thickness.  |

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| <p><i>AND</i></p> <p>NMED ID:<br/>MMMM</p> <p><i>AND</i></p> <p>NMED ID:<br/>MMMM</p> | <p><i>AND</i></p> <p>CANM / CCNS<br/>Robert Gilkeson, P.G.</p> <p><i>AND</i></p> <p>CANM / CCNS<br/>Robert Gilkeson, P.G.</p> | <p><i>AND</i></p> <p>Comment<br/>No. 52</p> <p><i>AND</i></p> <p>Comment<br/>No. 53</p> | <p>are known to accelerate the movement of volatile organic compounds to the groundwater. A dirt cover will break down within a 50 year time span or less due to many well-known physical and biological factors. The dirt cover at the MWL is inadequate for the protection of the groundwater for MWL wastes that can remain toxic for millennia.</p> <p><i>AND</i></p> <p>A commenter stated that the installation of a defective dirt cover cap cannot be protective of human health and the environment.</p> <p><i>AND</i></p> <p>A commenter stated that installation of a dirt cover does not meet the requirements of the RCRA.</p> | <p>It was successfully demonstrated by performance modeling that based on the average rainfall in the Albuquerque, New Mexico area, the constructed cover is equally as protective as a RCRA cover (which includes an impermeable layer). Further, inclusion of an impermeable layer was shown to negatively impact the longevity of the cover by not allowing for long-term differential settlement.</p> <p>The current evapotranspirative cover allows for moisture to be stored and then returned to the atmosphere by evaporation. Also, the soil serves as a reservoir for plants, which extract the stored water from the soil during the growing season and return it to the atmosphere. The cover is designed to prevent precipitation from reaching the wastes beneath the cover.</p> <p>The cover components are designed to weather to natural surrounding conditions over its 1,000 year life.</p> |
| <p>3<br/>NMED ID:<br/>MMMM</p>  | <p>CANM / CCNS<br/>Robert Gilkeson, P.G.</p>  | <p>Comment<br/>No. 3</p>  | <p>A commenter stated that all of the containers in the MWL are subject to collapse and decay and release of their contents. Collapse of containers can be a source for subsidence of the dirt cover.</p>   | <p>The current evapotranspirative cover allows for moisture to be stored and then returned to the atmosphere by evaporation. Also, the soil serves as a reservoir for plants, which extract the stored water from the soil during the growing season and return it to the atmosphere. The cover is designed to prevent precipitation from reaching the wastes</p>  |

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| <p><i>AND</i></p> <p>NMED ID:<br/>MMMM</p> | <p><i>AND</i></p> <p>CANM / CCNS<br/>Robert Gilkeson, P.G.</p> | <p><i>AND</i></p> <p>Comment<br/>No. 62</p> | <p><i>AND</i></p> <p>A commenter stated that the subsurface processes of subsidence, rainfall percolation creating a bathtub effect, climate change, and vapor phase transport are not adequately considered for the dirt cover.</p> | <p>beneath the cover, thereby preventing further migration of landfilled wastes.</p> <p>The cover was designed to allow for long-term differential settlement should subsidence of the cover occur. Should significant cover subsidence occur, it will be repaired as provided for under the LTMMP.</p> <p>The “bathtub” effect was considered during design. The cover was designed to prevent this phenomenon from occurring by ensuring the underlying soils and cover soils had similar permeabilities. The hydraulic conductivity of the cover soils is similar to that of the fine-grain soils that underlie the MWL.</p> <p>Performance modeling predicts that the cover should be adequate to limit infiltration into and percolation of moisture through the cover and into the waste.</p> <p>The NMED and the Permittees have no control over climate change. As provided for under the LTMMP, the landfill performance will be evaluated through inspection and monitoring. Should the cover fail to perform as expected or to protect human health and the environment because of climate change, or any other reason, the NMED has the authority to require modifications of the remedy or implementation of a new remedy based on the new information.</p> <p>The cover will not prevent vapor phase transportation of contaminants. However, the</p> |
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| <p><i>AND</i></p> <p>NMED ID:<br/>NNNN</p> | <p><i>AND</i></p> <p>Robert Gilkeson, P.G.</p>  | <p>Bullet No. 5</p> <p><i>AND</i></p> <p>Comment No. 37</p> | <p>MWL is not suitable for protection of the wastes from reaching the groundwater. The dirt cover is not properly monitored.</p> <p><i>AND</i></p> <p>A commenter stated that the dirt cover placed above the wastes cannot be protective of the aquifer considering the lengthy half-lives of some of the radionuclides which are combined with hazardous chemicals, heavy metals and solvents. The wastes were placed in inadequate containers that will decay and release contaminants over time.</p> | <p>The May 2003 MWL CMS Final Report indicates in the Risk Assessment in Appendix I that risks without any additional actions taken were protective of human health and the environment.</p>   |
| <p>7</p> <p>NMED ID:<br/>MMMM</p>          | <p>CANM / CCNS</p> <p>Robert Gilkeson, P.G.</p> | <p>Comment No. 45</p>                                       | <p>A commenter stated that a vegetation layer is not an appropriate closure action; A vegetation layer appears to be a violation of federal regulations and will allow migration of waste constituents and potential exposure of the local population; the vegetation layer will do nothing to prevent water already present in the landfill from continually leaching into soil below and</p>   | <p>Vegetation is an important component of the MWL cover. Vegetation removes moisture (within reach of roots) through transpiration, and helps considerably to reduce erosion of a cover's surface, thereby also minimizing maintenance.</p> <p>Vegetation growing on a landfill cover is not a violation of federal law. Supplemental watering at the MWL was conducted to establish the native vegetation growing on the cover. The placement of additional water over the wastes was necessary due to drought conditions which prevailed at the time the cover was installed.</p> |

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|                        |                                      |                   | has required additional water to be placed over the wastes; the vegetative layer will not prevent microorganisms and burrowing animals from reaching the waste and spreading it.   | No cover will prevent microorganisms from migrating through soil. Such life forms are abundant everywhere.<br><br>The bio-barrier will be effective in preventing burrowing animals from reaching the waste. The LTMMP contains provisions for inspecting the cover and taking action as necessary if burrowing animals are found to be present at the landfill.  |
| 8<br>NMED ID:<br>MMMM  | CANM / CCNS<br>Robert Gilkeson, P.G. | Comment<br>No. 58 | A commenter stated that the absence of any engineered barriers beneath the MWL and the absence of any engineered method to collect moisture beneath the dirt cover and absence of any system for the recovery of leachate beneath the cap or the pits and trenches of the MWL is a concern.        | Because the MWL is a SWMU, and not a hazardous waste management unit, the MWL is not subject to any design requirements under RCRA for new or replacement landfills or landfill cells. Performance modeling indicates that little moisture will penetrate the cover. Thus, in the case of the MWL, an engineered barrier and leachate collection system beneath the landfill are not needed to ensure protection of human health and the environment. |
| 9<br>NMED ID:<br>MMMM  | CANM / CCNS<br>Robert Gilkeson, P.G. | Comment<br>No. 73 | A commenter stated that there are no design or long-term maintenance provisions to protect the dirt cover from complete erosion.   | Monitoring under the LTMMP will ensure that the cover is functioning as intended. Should erosion of the cover occur, it will be repaired as required under the LTMMP.   |
| 10<br>NMED ID:<br>MMMM | CANM / CCNS<br>Robert Gilkeson, P.G. | Comment<br>No. 74 | A commenter stated that there is no liner beneath the dirt cover to carry leachate off to the sides of the MWL where leachate can then be collected. Inadequate monitoring is in place to determine loss of cover integrity, penetration of water into the dirt cover, entry of water into the MWL | Because the MWL is a SWMU, and not a hazardous waste management unit, the MWL is not subject to any design requirements under RCRA for new or replacement landfills or landfill cells. Performance modeling indicates that little moisture will penetrate the cover. Thus, in the case of the MWL, an engineered barrier and leachate collection system beneath the landfill are not needed to ensure protection of human health and the environment. |

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|                        |                                      |                   | wastes, and leaching of those wastes.  | Monitoring under the LTMMP will ensure that the cover is functioning as intended.   |
| 11<br>NMED ID:<br>MMMM | CANM / CCNS<br>Robert Gilkeson, P.G. | Comment<br>No. 75 | A commenter stated that compliance monitoring should be imposed at present due to releases from the MWL and exceedances of EPA MCLs for soil gas and heavy metals. These and other concerns were raised by a 2006 TechLaw, Inc. report. The TechLaw report was wrongfully withheld from CANM until 2009. CANM hereby incorporates all concerns for the dirt cover contained in the TechLaw report. | As noted previously by the NMED in Response 13 for the CMI Report, a representative of TechLaw, in their Comment No. 5, expressed concern whether the cover was designed to last 1,000 years or more, and indicated that it was unlikely that the U. S. Government can or will maintain the integrity of the cover for 1,000 years. TechLaw was tasked by the NMED to review the Fate and Transport Model (FTM) found in Appendix E of the CMI Plan, not the design of the cover. Thus, the TechLaw representative, who did not review the cover design in any detail could not have commented on the adequacy of the design of the cover in any credible manner. |
| <i>AND</i>             | <i>AND</i>                           | <i>AND</i>        | <i>AND</i>   | As provided for under the LTMMP, the landfill performance will be evaluated through inspection and monitoring. Should the cover fail to perform as expected to protect human health and the environment for any reason, the NMED has the authority to require modifications of the remedy or implementation of a new remedy based on the new information.   |
| NMED ID:<br>NNNN       | Robert Gilkeson, P.G.                | Comment<br>No. 36 | A commenter stated that the 2006 TechLaw, Inc., report revealed: an inadequate dirt cover design; inadequate provisions for monitoring moisture beneath the dirt cover with neutron tubes; the need for an impermeable liner beneath the dirt cover, and an inadequate DOE/Sandia computer model for fate and transport of contaminant movement beneath the MWL.                                   |   |