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DAVE MARTIN
Secretary

RAJ SOLOMON, P.E.
Deputy Secretary

May 20, 2011

**RE: SANDIA NATIONAL LABORATORIES MIXED WASTE LANDFILL
CORRECTIVE MEASURES IMPLEMENTATION REPORT**

Dear Commenters:

The New Mexico Environment Department (NMED) received numerous comments regarding the Corrective Measures Implementation Report (CMI Report) for the Sandia National Laboratories (SNL) Mixed Waste Landfill (MWL). In accordance with the May 26, 2005 Final Order issued by the NMED Secretary, the NMED issued a noticed on November 29, 2010 announcing a 60-day public comment period for the CMI Report. The comment period was later extended 30 days from January 28, 2011, to February 28, 2011. The following table summarizes the comments received and contains NMED's responses.

In addition, NMED issued a Notice of Disapproval (NOD) to SNL on April 29, 2011 regarding the MWL CMI Report. This letter, the attached response to comments and the April 29, 2011 NOD can be viewed on the NMED website at:

<http://www.nmenv.state.nm.us/hwb/snlperm.html#MWLCMIReport>

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Kieling".

John E. Kieling
Acting Chief
Hazardous Waste Bureau

**Response to Comments Received by NMED on the SNL MWL CMI Report
May 2011**

On May 26, 2005, the New Mexico Environment Department (NMED) Cabinet Secretary issued a Final Order requiring in part the installation of a vegetative soil cover with bio-intrusion barrier at the Sandia National Laboratories' (SNL's) Mixed Waste Landfill (MWL). The U. S. Department of Energy and Sandia Corporation (Permittees) were also required under provisions of the Final Order and associated modification of Module IV of the SNL Hazardous Waste Operating Permit to submit to the NMED a Corrective Measures Implementation (CMI) Report for the MWL within 180 days of completing construction of the cover. The MWL CMI Report was transmitted to the NMED on January 26, 2010. The purpose of the CMI Report is to document the as-built construction of the landfill cover.

On November 29, 2010, the NMED issued a notice announcing a 60-day public comment period for the CMI Report. The comment period was later extended 30 days from January 28, 2011, to February 28, 2011. The following table summarizes the comments received and contains the NMED's responses thereto as required by the May 26, 2005 Final Order.

Comment Number	Topic Area	Summary of Public Comment	NMED Response
1	Deny the CMI Report and Conduct a Hearing on Remedy Selection	The Mixed Waste Landfill (MWL) Corrective Measures Implementation (CMI) Report should be denied and a public hearing held to select a different remedy.	<p>The NMED will not deny the Mixed Waste Landfill (MWL) Corrective Measures Implementation (CMI) Report. The NMED held a public hearing in December 2004 for the purpose of remedy selection. The final decision to construct the cover, along with other requirements, was made by the NMED Cabinet Secretary (at the time) in his Final Order of May 26, 2005. NMED will not revisit remedy selection for the MWL unless there is credible scientific information that the remedy is not protective of human health and the environment. The five-year reviews ordered by the Secretary on May 26, 2005, provides for periodic analysis of the future protectiveness of the cover.</p> <p>The cover will maintain a low and thus acceptable level of risk to the public, workers, and the environment, is a proven reliable and effective technology, and will further reduce waste mobility. The cover will prevent wastes from endangering our citizens, our ground water, and our environment by minimizing the infiltration and percolation of moisture into the landfill, by preventing the intrusion of small animals into waste, and by shielding people, workers, and the environment from harmful radiation.</p>
2	Risk Assessment	The commenters state that a risk assessment should be performed for the MWL. They refer to a 1998 Notice of Deficiency (NOD) issued by the NMED to support their argument that a risk assessment should be performed, and especially a risk assessment that considers groundwater as a complete pathway to human receptors. They also state that a risk assessment is needed because new information has surfaced since the 2004	<p>The comment is not relevant to the CMI Report.</p> <p>The 1998 NOD addressed the risk assessment found in the Phase II RCRA Facility Investigation Report for the MWL. An additional risk assessment was prepared as part of the MWL Corrective Measures Study (CMS) Report completed in May 2003. The risk assessment in the CMS was debated in considerable detail during the public hearing held in December 2004 and was a significant line of evidence considered in the selection of the evapotranspiration (ET) cover combined with long-term monitoring and maintenance as the best remedial alternative for the landfill.</p>

		public hearing for remedy selection.	Both the newly installed (2008) wells and the now-abandoned older wells at the MWL have yielded water samples demonstrating that the landfill has not caused groundwater contamination (see Comment Number 12). Furthermore, vadose-zone investigations completed since 2004 have yielded results that are consistent with data obtained during the RCRA Facility Investigation (RFI) completed in 1996 and continue to indicate that groundwater is unlikely to become contaminated (see also Comment Number R23). Because groundwater is not and is unlikely to become contaminated, a complete pathway to receptors does not exist and will not likely exist via the groundwater pathway. Thus, a revised risk assessment with groundwater as a pathway in the analysis is not warranted.
3	Excavate the MWL	Excavate the MWL and store the waste in an engineered facility located on site.	The comment is not relevant to the CMI Report. NMED will not require that the MWL be excavated in the absence of information demonstrating that the cover is not protective of human health and the environment. See Comment Number 1.
4	Install Groundwater Monitoring Wells	The commenters believe that new groundwater monitoring wells should be installed at the MWL, with the installation plans made available to the public for comment as required by 40 CFR § 270.42. They further state that the NMED requirement in 2007 to install new groundwater monitoring wells was a significant alteration of the permit for the MWL and that the installation plan should have been subjected to public comment as a Class 3 permit modification request. Furthermore, they believe that the current monitoring well network (MWL-MW4, MWL-MW5, MWL-MW6, MWL- MW7, MWL-MW8 and MWL-MW9 and MWL-BW2) needs to be replaced because it does not meet the intended purposes to monitor contamination at the water table, measure the elevation of the water table and accurately determine the direction and velocity of groundwater flow.	The comment is not relevant to the CMI Report. The regulations at 20.4.1.900 NMAC incorporating 40 CFR § 270.42 (concerning permit modifications) do not apply to the MWL. See Comment Number 30. The newest wells at the MWL were installed in 2008 and are screened across the water table. These wells are suitable for monitoring for contaminants in groundwater at the water table and now make up the primary monitoring well network for the MWL. The wells also can be used to measure the elevation of the water table, and thus, can be used to evaluate the direction and gradient of groundwater flow. The average linear velocity of the groundwater can also be estimated using the gradient and also taking into account the hydraulic conductivity and the porosity of the aquifer. Wells MWL-MW4, MWL-MW5, and MWL-MW6 are being maintained for future groundwater monitoring if circumstances should arise that require them.
5	Disclosure of Information and effectiveness of Regulatory Oversight	The commenter states that grounds exist for the termination of the MWL permit under 40 CFR § 270.43, which provides for the termination of permits where relevant facts have not been fully disclosed and/or relevant facts have been misrepresented.	The comment is not relevant to the CMI Report. There is no permit for the MWL to terminate. See Comment Number 30. NMED has properly overseen corrective action at the MWL in accordance with requirements of the New Mexico Hazardous Waste Act and the New Mexico Hazardous Waste Management Regulations, the latter which adopts the regulations under RCRA by incorporation.

		<p>The commenter further states that NMED has failed to properly oversee the MWL under the Resource Conservation and Recovery Act (RCRA), including failure to issue approvals for proposed corrective actions based upon true and correct information, repeatedly issuing approvals which do not conform to the requirements of RCRA, failure to comply with public participation requirements, and failure to determine compliance, verify the accuracy of information submitted by the Permittees, and verify the accuracy of sampling, monitoring and other methods.</p> <p>The commenter also claims that NMED and Sandia presented erroneous testimony at the public hearing for the CMS in December 2004 by claiming that a reliable network of monitoring wells was in place at the MWL.</p>	<p>The administrative record that existed at the time of the December 2004 public hearing was made available to the public. Parties to the hearing and the public had access to the entire record before and during the public hearing. Furthermore, the New Mexico Court of Appeals affirmed that the NMED followed all regulatory requirements to involve the public in the remedy decision-making process, which included hosting the public hearing, and that NMED even went beyond what is required to provide for public participation. NMED has provided or offered to make available additional information to the Parties and the public since the hearing.</p> <p>Furthermore, NMED did not state at the public hearing and does not currently agree that the groundwater monitoring network was unreliable (see also Comment Number 17). Thus, NMED did not present erroneous or false testimony at the December 2004 hearing.</p> <p>The taking of and responding to public comment on this document (CMI Report) is yet another example of NMED going beyond what is required by regulation or law with regard to providing public participation opportunities.</p>
6	Monitoring Well Locations	<p>The commenters state that groundwater monitoring wells are not properly located downgradient from the MWL, including south of the landfill, thus, contaminants may not be detected. The commenters also assert that an upgradient background monitoring well was not installed until 2008.</p> <p>The commenters refer to a 1991 Tiger Team assessment report, a 1991 Los Alamos National Laboratory report, NMED reports from 1993 and 1994, a Notice of Deficiency (NOD) issued by the U. S. Environmental Protection Agency (EPA) in 1994, and a NOD issued by the NMED in 1998 to support their argument that wells at the MWL are not properly located.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>The commenters cite old, out-of-date reports and other documents. Additional groundwater monitoring wells have been installed at the MWL since these reports and other documents were prepared by the NMED, Los Alamos National Laboratory, EPA, and the U. S. Department of Energy Tiger Team.</p> <p>The horizontal component of groundwater flow beneath the MWL is approximately west-northwest. The wells completed on the west boundary of the MWL, including the wells installed in 2008, are appropriately located in consideration of the groundwater flow direction.</p> <p>The original background well (MWL-BW1), installed in 1989 and located cross-gradient at a distance of approximately 450 ft from the landfill, yielded groundwater samples that showed no evidence of contamination from the landfill. Thus, the original background well was adequate to serve its intended purpose, it yielded water samples representative of background conditions. MWL-BW1 has since been abandoned, and replaced with well MWL-BW2, which is located east of the landfill.</p>
7	Corroded Well Screens	<p>Groundwater monitoring wells have corroded wells screens</p>	<p>The comment is not relevant to the CMI Report.</p> <p>The stainless-steel screens of wells MWL-MW1 and MWL-MW3 succumbed to appreciable corrosion which became particularly problematic for the wells during the last years of their service lives. As time passed, water samples obtained from these wells carried chromium and</p>

			<p>nickel at increasing concentrations that eventually exceeded background levels because of corrosion. NMED is confident that the chromium and nickel did not originate as a release from the landfill because these metals are not present pervasively above background levels in subsurface soil beneath the landfill.</p> <p>Wells MWL-MW1 and MWL-MW3 have now been abandoned. The newest monitoring wells at the MWL (installed in 2008) are constructed with polyvinyl chloride (PVC) screens. The PVC screens do not contain chromium or nickel. Chromium and nickel have been detected in water samples obtained from these new wells only at background levels, confirming that these metals are not groundwater contaminants.</p>
8	Detection of Contaminants	<p>The commenters argue that groundwater monitoring wells at the MWL were drilled using bentonite mud, and that the drilling mud prevents contamination from being detected. The wells, therefore, can not provide representative and reliable water samples.</p> <p>The commenters refer to a 1993 NMED report, and a NMED letter issued to the Permittees on July 2, 2007, to support their argument that wells at the MWL can not provide representative and reliable groundwater samples because they were installed using the mud-rotary method, and with bentonite mud.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Only some of the older wells installed at the MWL were completed using the mud rotary drilling method. All of the wells installed in 2008 were completed using the air rotary casing hammer (ARCH) drilling method. Although wells drilled by the mud rotary method can yield representative groundwater samples if the wells are properly developed, the NMED discourages the use of the mud rotary drilling method to install monitoring wells.</p> <p>NMED determined that the older, now-abandoned, wells at the MWL provided reliable and representative groundwater samples (see Comment Number 17). The wells installed at the MWL in 2008 were completed without the use of bentonite mud or the mud rotary drilling method. Water samples obtained from these new wells continue to indicate that groundwater has not been contaminated by the landfill.</p>
9	Releases of Tritium and Solvents	<p>The commenters state that there is a new release of tritium and solvents from the MWL based on data from a field investigation conducted in 2008. The commenters argue that a 10-fold increase of tritium contamination was found by the investigation and that further investigation is warranted.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Some soil samples collected in 2008 exhibited tritium levels that were higher than those observed in 1995 because they were collected closer to the disposal areas containing tritium sources. The tritium levels detected in 2008 do not indicate that a new release of tritium has occurred, and more importantly, do not represent a threat to human health or the environment. Thus, further investigation of tritium is unwarranted based on the 2008 sampling results.</p> <p>Additionally, the NMED does not have the authority to regulate tritium, a radioactive substance.</p> <p>Soil-gas (solvent) monitoring results for the 2008 investigation are consistent with those observed during the RCRA Facility Investigation completed in 1996. The soil-gas concentrations detected in the landfill in both 2006 and 2008 are low, and like tritium, do not pose a threat to human health or the environment.</p>
10	Pumping and Slug Tests	<p>The commenter asserts that the Permittees used flawed pumping and slug test data to calculate hydraulic conductivities and</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Hydraulic conductivity data, along with porosity and gradient, can be used to estimate the</p>

		<p>estimates of groundwater velocity.</p> <p>The commenter refers to a 1998 NOD issued by the NMED to support their argument that the pumping test data are flawed.</p>	<p>average linear velocity of groundwater.</p> <p>The hydraulic conductivity obtained from a pumping test conducted at MWL-MW4 is not considered by the NMED to be reliable data as indicated by the NMED in the 1998 document cited by the commenter. The pumping test failed because the pumping rate was too low to stress the aquifer and produce drawdown in observation wells that matched a type curve.</p> <p>Slug tests were also conducted on the older, now abandoned monitoring wells. The slug test results yielded hydraulic conductivity data that are consistent with what would be expected for the lithologies encountered at the screen intervals of these wells.</p> <p>Finally, as pointed out in the 1998 NOD, “Unless groundwater contamination is detected and confirmed in one or more MWL wells, there is no need to establish hydraulic properties of the aquifer from field studies”. Pumping tests are almost never done at sites where groundwater clean ups are not required.</p>
11	Monitoring Well MWL-MW-4	<p>The commenter states that groundwater monitoring well MWL-MW4 is defective based on a NOD issued by the NMED in 1998. The commenter excerpts from this NOD that:</p> <ol style="list-style-type: none"> 1.) the top of the upper screen of MWL-MW4 is located approximately 22 ft below the water table. Because of the vertical gradient and the way the well is constructed, MWL-MW4 is of no value for determining the elevation of the water table (and therefore, the horizontal direction of ground-water flow and the horizontal gradient), and 2.) Because the top of the upper screen of MWL-MW4 is located 22 feet below the water table, the well is of little value for detecting any groundwater contamination (if any exists) that may be present in the saturated zone just below the water table. 	<p>The comment is not relevant to the CMI Report.</p> <p>Well MWL-MW4 is not defective. As pointed out in the NMED’s NOD issued in 1998, the well can not provide water-level or water-quality data <i>that are representative of conditions at the water table.</i></p> <p>However, the well, which is constructed with two screened intervals, which are normally separated by a packer, does have value in that it can be and has been used to assess total head and water quality at two different depths below the water table.</p>
12	Groundwater Quality	<p>The commenters cite excerpts from a 1998 NOD issued by the NMED in an effort to demonstrate that the MWL is the source for nickel contamination in the groundwater. They also claim that background water quality data from well MWL-BW2, and</p>	<p>The comment is not relevant to the CMI Report.</p> <p>The MWL has not caused groundwater contamination as demonstrated by nearly two decades of monitoring.</p> <p>The excerpts cited by the commenters from the 1998 NOD point to certain detections of metals</p>

		<p>comparison of recent data from the older and newest wells provide evidence that wastes in the landfill have contaminated the groundwater with nickel, cadmium, chromium, and nitrate, and possibly with tetrachloroethene (PCE).</p>	<p>in a few soil samples that exceeded the approved background concentrations for these constituents. NMED later determined based on further analysis that these data, including those for nickel and chromium, were not representative of a contaminant release from the landfill. Although it appears that a release of cadmium at low concentrations occurs in soil beneath the west side of the landfill, cadmium is not a groundwater contaminant at the MWL. Water samples from groundwater monitoring wells installed in 2008 along the west boundary of the landfill continue to confirm that cadmium is not a groundwater contaminant.</p> <p>Nitrate occurs in the groundwater at the MWL at about 4 mg/L or at about half the New Mexico Water Quality Control Commission (NMWQCC) standard of 10 mg/L. There are no known nitrate sources in the MWL suggesting that the nitrate may originate from local septic systems. Regardless, the nitrate levels do not exceed the NMWQCC standard.</p> <p>The elevated nickel and chromium levels seen in groundwater samples from wells MWL-MW1 and MWL-MW3 were derived from the corrosion of their stainless-steel well screens (see Comment Number 7). Water samples collected from the new background well MWL-BW2, as well as from the other new wells installed in 2008, contain only background levels of naturally-occurring groundwater constituents, including nickel and chromium.</p> <p>Although tetrachloroethene (PCE) has been detected in soil gas beneath the MWL, the concentrations of PCE in the soil gas are too low to contaminate groundwater.</p>
13	TechLaw Report	<p>The commenter asserts that the TechLaw report concerned computer modeling and cover construction for the MWL, and furthermore, that the Department kept the report secret via a lawsuit until the report was released in late 2009. The commenter also states that the NMED provided no opportunity to the public to be informed of or to discuss the concerns identified for the landfill cover in the TechLaw Report.</p> <p>The commenter also asserts that the TechLaw Report describes the Sandia computer model (Fate and Transport model) as a “Black Box,” and cautioned NMED against its acceptance to predict contaminant movement beneath the MWL.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>TechLaw was tasked by the NMED to review the Fate and Transport Model (FTM) found in Appendix E of the CMI Plan. TechLaw did not review the CMI Report.</p> <p>TechLaw was not asked to review the cover design presented in the CMI Plan because the design was essentially identical to another design previously reviewed by TechLaw and the NMED.</p> <p>All but four of the eleven TechLaw comments were included in the NOD issued for the CMI Plan on November 20, 2006 (some comments were edited by the NMED for clarity). The November 2006 NOD was made available for public inspection via its posting on NMED’s web page. In addition to the eleven TechLaw review comments, one other issue raised by TechLaw in their transmittal letter that accompanied their review comments was added to the NOD. This additional comment concerned the “Black Box” issue, and as mentioned above, this comment was included as Comment #11, Part 2, of the NOD that was made available to the public.</p> <p>The four TechLaw comments that were not used to generate the 2006 NOD are as follows:</p> <ol style="list-style-type: none"> 1.) TechLaw comment #2 recommended inclusion of a regulatory reference for hydraulic conductivity (40 CFR § 264.310(a)(5)); 2.) TechLaw comment #5 expressed concern whether the cover was designed to last 1000

			<p>years or more, and opined that it was unlikely that the U. S. Government can or will maintain the integrity of the cover for 1000 years;</p> <p>3.) TechLaw comment #6 concerned use of a different waste thickness for the modeling of cadmium compared to most other hazardous constituents; and</p> <p>4.) TechLaw comment #9 recommended that the trigger evaluation process be revised.</p> <p>Aside from this not being a particularly significant comment, TechLaw comment #2 was not included in the November 2006 NOD because the regulation suggested as an additional reference does not apply to the MWL (because the landfill does not have an operating permit). Also see Comment Number 30.</p> <p>TechLaw comment #5 was not included in the November 2006 NOD because the landfill is expected, based on its design, to last 1000 years (see Comment Number 15). Additionally, although NMED can't predict the future, NMED must assume that the federal government will exist for the next 1000 years and will do whatever is necessary to protect human health and the environment, including maintaining the landfill cover.</p> <p>TechLaw comment #6 was not included in the NOD because the TechLaw reviewer initially misunderstood the conservative approach that was undertaken for cadmium in the FTM. The TechLaw reviewer was unaware of site characterization data that suggested that low levels of cadmium were present in subsurface soil along the west boundary of the landfill. Based on this characterization data, cadmium was modeled to have a larger waste thickness compared to most other constituents in the FTM. NMED consulted with the TechLaw reviewer about this situation, and it was agreed that this particular comment should not be included in the NOD.</p> <p>TechLaw comment #9 was not included in the 2006 NOD because NMED believes it would be best to address this issue as part of the Long-Term Monitoring and Maintenance Plan to be developed for the MWL. NMED agrees with TechLaw (and the Permittees) that a statistical approach needs to be developed to determine the significance of any monitoring results that exceed a trigger level.</p> <p>As mentioned preciously, the TechLaw comment concerning the "Black Box" issue was included as Comment #11, Part 2, of 2006 NOD. The "black box" issue concerned a lack of certain details in the FTM Report regarding the modeling methods (codes) used, data quality objectives, quality assurance, details regarding specific inputs and outputs for modeling runs, sensitivities of input parameters, and bias. The Permittees later addressed the "Black Box" issues to the satisfaction of the TechLaw reviewers and the NMED in their response to the 2006 NOD submitted on January 19, 2007.</p>
14	Cover Design	The commenters state that the existing cover installed over the MWL is defective because it is not the required design.	Pending response from the Permittee to the NOD issued for the CMI Report, the landfill cover, as constructed, appears at least at this time to meet or exceed the approved design found in the CMI Plan. The ET cover design is appropriate for the geologic and climatic conditions that exist at the MWL. See also Comment Number 1.
15	Cover Longevity	The commenters state that the cover will not	The comment is not relevant to the CMI Report.

		be protective for the thousands of years required to protect the environment from long-lived radionuclides associated with some of the waste in the MWL.	See Comment Numbers 3 and 14. Exposure to radioactivity constitutes the most significant hazard associated with radionuclides in the landfill. Workers and the public are protected from radioactivity because of the shielding effect of the landfill cover. The cover was designed to minimize maintenance, and is expected to last for a significant amount of time. For example, 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 1000 years even if no maintenance was actually performed to replace soil eroded from the cover.
16	Soil-Moisture Monitoring	The commenters argue that the existing soil moisture probes below the MWL are inadequate because they only monitor below a small number of the pits and trenches, they do not monitor continuously, and they do not monitor the breakthrough of moisture at the base of the dirt cover.	<p>The October 10, 2008, NOD issued for the MWL CMI Plan noted that the deep soil moisture monitoring system already in place at the landfill could not be effectively used to measure the breakthrough of moisture through the landfill cover. During construction of the cover, the Permittees installed another monitoring system at the base of the cover to monitor for moisture breakthrough.</p> <p>Located in an arid environment, breakthrough events at the MWL will occur only rarely, and moisture will migrate slowly through soil. Few stations are actually needed to monitor for moisture as the amount of moisture infiltration and percolation would not be expected to vary significantly across the cover. Thus, monitoring continuously beneath all or most of the pits and trenches is unnecessary, and the newly constructed soil-moisture monitoring system should be adequate.</p>
17	2006 NMED Report	<p>The commenter states that the conclusions of the 2006 NMED report entitled <i>Evaluation of the Representativeness and Reliability of Groundwater Monitoring Well Data, Mixed Waste Landfill, Sandia National Laboratories</i> (by William P. Moats, David L. Mayerson and Brian L. Salem; referred to as the 2006 Report) are wrong for the following reasons.</p> <ol style="list-style-type: none"> 1.) the evaluation of the water quality data was based on only four of the seven wells, 2.) the conclusions rely on the FTM rejected by the TechLaw report, 3.) the authors ignored the conclusions of a 1993 NMED report, 4.) the authors ignored findings in an NMED NOD issued in 1998 that described the MWL monitoring well network as being inadequate; and 5.) the scientific community including 	<p>The comment is not relevant to the CMI Report.</p> <p>The NMED disagrees with this comment and believes that groundwater data obtained from the older, now abandoned monitoring wells at the Mixed Waste Landfill (MWL) were generally reliable and representative of formation water quality as discussed in the cited NMED report: <i>Evaluation of the Representativeness and Reliability of Groundwater Monitoring Well Data, Mixed Waste Landfill, Sandia National Laboratories</i>.</p> <p>At the time the 2006 report was prepared, seven ground-water monitoring wells were located at the MWL (MWL-BW1, MWL-MW1, MWL-MW2, MWL-MW3, MWL-MW4, MWL-MW5, and MWL-MW6). Wells MWL-MW1, MWL-MW5 and MWL-MW6 were installed using the air-rotary casing hammer (ARCH) method. Well MWL-MW4 was drilled using sonic resonant technology; whereas, wells MWL-BW1, MWL-MW2 and MWL-MW3 were completed via the mud rotary drilling method. In the above mentioned report, groundwater data from the mud rotary wells (MWL-BW1, MWL-MW2, and MW1-MW3) were compared to corresponding data from wells completed by the other drilling methods (MWL-MW1 and MWL-MW4) and to background hydrochemistry data for the Kirtland Air Force Base area. The evaluation focused properly on the four wells where drilling fluids (and possible grout intrusion) were an issue. The results of this effort found that the mud rotary wells, in addition to the other wells at the MWL, yielded reliable and representative groundwater samples.</p> <p>The conclusions of the 2006 report do not rely on the FTM. The 2006 report only mentions the</p>

		<p>the EPA and the National Research Council (NRC), has rejected the method of using only the chemistry of groundwater samples to evaluate the ability of monitoring wells completed using bentonite drilling mud to provide reliable and representative water samples.</p>	<p>FTM with regard to the model's prediction that tritium, radon, volatile organic compounds, and cadmium are unlikely to affect (contaminate) groundwater in the future. Furthermore, TechLaw did not reject the FTM. See Comment Number 13.</p> <p>The authors of the 2006 report did not ignore information in the 1993 report and 1998 NOD. The groundwater monitoring issues raised in the 1993 report and the 1998 NOD had already been addressed by the Permittee. Additional monitoring wells have been installed at the MWL since 1998. See Comment Numbers 6, 8, 11, and 12.</p> <p>Regardless of whether the EPA or NRC accepts the conclusions of the 2006 report, the newest wells installed at the MWL in 2008 continue to demonstrate that the MWL has not caused groundwater to become contaminated. These wells were not completed using the mud rotary method, and did not involve the use of drilling mud.</p>
18	Vapor Transport	<p>The commenter states that the drying of soil composing a cover will allow vapor transport to occur more readily. The commenter cites a report by the National Academy of Sciences and a 2002 report by Tom Hakonson, Ph.D., Environmental Evaluation Services, LLC in support of this comment.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>In general NMED agrees with the comment. However, the measured concentrations of contaminants in soil-vapor beneath the MWL are low and do not represent a threat to human health or the environment (see Comment Number 9).</p>
19	EPA Region 6 OIG Report	<p>The commenters state that a 2010 report by the U. S. Environmental Protection Agency (EPA) Office of Inspector General (OIG) found that EPA Region 6 had concerns about the MWL's effect on groundwater and the groundwater monitoring network. The commenter further states that the OIG found EPA's Region 6 withheld information from the public regarding the MWL monitoring wells through discontinuation of record keeping, misleading communications, and inappropriate classification.</p> <p>The commenter further states that new information presented to NMED by EPA Region 6 would have justified the application of different permit conditions at the time of issuance and constituted a cause for modification of the permit.</p> <p>The commenter also claims that NMED entered into an agreement with EPA Region 6 to withhold information and documentation</p>	<p>The comment is not relevant to the CMI Report.</p> <p>If EPA has any concerns about groundwater monitoring at the MWL, such concerns have not been passed on to the NMED. NMED has no comment on the Inspector General's Report except that it's the Department's understanding that EPA Region 6 disagrees with many of the findings of the report.</p> <p>There is no operating permit for the MWL to modify. See Comment Number 30.</p> <p>NMED does not have any agreement with the EPA or any other entity regarding the withholding of information from the public or any entity.</p>

		from Citizen Action and the public regarding the groundwater monitoring network at the MWL.	
20	Waste Characterization	The commenter states that wastes at the MWL have not been adequately characterized.	<p>The comment is not relevant to the CMI Report.</p> <p>For most old landfills, records of waste disposal are not available. Because some records were kept for the MWL, the types and quantities of wastes disposed of in the landfill are partially known. There are hundreds of waste types in the MWL that occur in small quantities, but most of these waste types have limited ability to migrate in the absence of water. The cover will minimize the amount of water than can move through the landfill and mobilize contaminants.</p>
21	Waste Stabilization	The commenter claims that unsolidified, hazardous chemicals such as acids, solvents, trichloroethene, and carbon tetrachloride, were disposed of in the classified section of the MWL from 1959-1962, and that it was not until 1975 that SNL required liquid wastes to be solidified before being placed in the MWL.	<p>The comment is not relevant to the CMI Report.</p> <p>Sampling and analysis of subsurface soil beneath the MWL indicate that such chemicals (or hazardous constituents thereof) have not migrated from the landfill in liquid form.</p>
22	High-Level Waste	The commenter asserts that the MWL contains high-level radioactive wastes from nuclear reactor operations at the Annular Core Research Reactor, and that it is illegal to dispose of high-level waste at the MWL. The commenter further states that Pu-239, Americium-241 and Niobium-94 with long half-lives were disposed of in the MWL, and that these types of contaminants will remain a perpetual hazard to Albuquerque.	<p>The comment is not relevant to the CMI Report.</p> <p>The NMED has no authority to regulate radioactive waste at a U. S. Department of Energy facility. However, NMED believes that the cover provides protection from radioactive waste that can't move in vapor form, such as Pu-239, Americium-241 and Niobium-94 (see Comment Number 1).</p>
23	Soil-Gas Monitoring	The commenters believe that the proposed soil-gas monitoring well network is inadequate because it does not monitor below most or all of the pits and trenches.	<p>The comment is not relevant to the CMI Report.</p> <p>Details of the soil-gas monitoring network will be addressed under the Long-Term Monitoring and Maintenance Plan (LTMMP). The revised LTMMP has not yet been submitted to the NMED.</p> <p>The original footprint of the MWL covers 2.6 acres. Soil-gas plumes will migrate chiefly along the path of least resistance. Because sediments with near horizontal orientation underlie the MWL, and some have hydraulic conductivities that are likely greater in the horizontal direction than the vertical direction, soil gas is expected to spread laterally as well as vertically through the vadose zone. This was the case with the nearby Chemical Waste Landfill where geological conditions are similar and soil-gas concentrations prior to conducting soil-vapor extraction were once much higher on average than those found at the MWL. Any soil-gas plume at the MWL with concentrations high enough to pose an unacceptable risk to human health or the</p>

			environment would spread laterally and would be detected by the deployment of a relatively small number of soil-vapor monitoring wells. Thus, it is not necessary to install soil-gas monitoring wells beneath all or most trenches and pits at the landfill.
24	WERC Review of MWL Corrective Measures Study	<p>The commenters assert that the WERC panel was not informed of the existence of unreliable data from the groundwater monitoring well network at the MWL and contamination of the groundwater.</p> <p>They further state that references, such as the 1998 NOD were not provided to the WERC and that this constituted withholding of relevant facts about the landfill.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>To the best of NMED's knowledge, the WERC had access to all groundwater and vadose-zone data and well construction information that existed at the time.</p> <p>NMED disagrees that data from the groundwater monitoring well network are unreliable, and that the MWL has contaminated groundwater (see Comment Numbers 12 and 17).</p>
25	Design and Installation of New Wells	<p>Three of the four newer groundwater monitoring wells were installed too deep to detect contamination and measure the elevation of the water table. The well screens are 30 ft in length rather than the EPA-required length of 10 ft. The three wells require replacement as soon as possible.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>The newest monitoring wells (2008 wells) installed at the MWL substantively meet regulatory requirements under the New Mexico Hazardous Waste Management Regulations (20.4.1 NMAC), requirements pursuant to the Sandia Consent Order (April 29, 2004), and guidance issued by the U. S. Environmental Protection Agency (EPA).</p> <p>There is no EPA requirement that well screens must be 10-feet long. Well screens installed on all of the new wells at the MWL are 30-feet long. For each well, it was intended that 25 feet of each screen was to be constructed below the water table, and 5 feet of screen above the water table. Thus, 25 ft of each screen was to be in contact with saturated sediments. NMED allowed the use of longer screens in this case to allow for increased well life given that the water table beneath the MWL is dropping about 0.9 feet/year, and taking into consideration that monitoring for the last two decades demonstrates that the landfill has not caused groundwater contamination.</p> <p>As built conditions of the newest wells at the MWL indicate that the height of the water column above the bottom of the screen interval of each well is actually smaller than the intended 25 ft. Based on water level measurements obtained in October 2009, the water column height is 21.5, 7.91, 6.41, and 6.70 ft for MWL-BW2, MWL-MW7, MWL-MW8, and MWL- MW9, respectively. Thus, the saturated screen intervals for all three downgradient wells are actually less than 10 ft. The wells are expected to go dry sooner than originally anticipated because of the dropping water table, and will eventually need to be replaced with wells screened at deeper depths than is currently the case.</p>
26	Monitoring of Uppermost Aquifer	<p>The commenters state that a groundwater monitoring well network has not been installed in the uppermost aquifer as defined by RCRA and also as required by the April 29, 2004 Compliance Order on Consent.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Uppermost aquifer in this case means that part of the saturated zone beneath the MWL that is at or near the water table.</p> <p>The 2008 wells at the MWL and several of the now-abandoned older wells were installed with</p>

			<p>their screens spanning the water table. Thus, wells have been and are installed in the uppermost aquifer.</p>
27	Hydrostratigraphic Units	<p>The commenter states that there are two zones of saturation below the MWL that require networks of monitoring wells. A reliable network of monitoring wells was not installed in either of the two zones.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>See Comment Number 26 concerning the uppermost zone of saturation and Comment 17 concerning the reliability of the monitoring well network.</p> <p>Because groundwater contamination is not present in the uppermost zone of saturation, there is no justification to install wells at deeper depths within the aquifer.</p>
28	Sampling Methods	<p>The commenter states that high-flow pumping methods are employed at wells MWL-MW1, MWL-MW2, MWL-MW3, MWL-MW4, MWL-MW7, MWL-MW8, MWL-MW9 and MWL-BW1 that causes the wells to be purged dry and water samples to become highly aerated. The commenter further states that samples were collected after purging up to a week later, and that this sampling method removes volatile and trace metal contaminants from the water samples.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Wells MWL-MW1, MWL-MW2, MWL-MW3, and MWL-BW1 have been abandoned.</p> <p>Several of the wells at the MWL are or were constructed such that their screens straddle the water table. The surface of the water contained in any given well is in contact with air. The formation water at the water table surrounding the wells is also in contact with air. No matter what sampling procedures are employed, some of the water that flows into the wells that are screened across the water table will have been exposed to air.</p> <p>Many of the wells at the MWL are low yield wells (will purge dry). There are no regulations or guidance that state that low yield wells are unacceptable. It is a standard EPA procedure to purge low yield wells dry, and then to collect water samples from them as soon as possible after they have sufficiently recovered. Low yield wells at the MWL in the past have sometimes taken days to recover after being purged dry. The fact that it took so much time for the wells to recover indicates that the groundwater flow into these wells was not turbulent, hence there is little concern that appreciable volatile organic compounds were stripped from the water samples due to turbulent flow.</p> <p>Additionally, the pumping and sampling procedures employed by the Permittees are appropriate, and in fact are a necessity given the natural conditions that exist at the MWL. The majority of the wells at the MWL are low yield wells because the saturated sediments that they intercept have low hydraulic conductivity (K_{sat} – K_{sat} is a physical property that essentially is a measure of how easy groundwater can flow through the aquifer). The NMED and EPA both recognize that low yield wells exist in the real world and sometimes that ideal sampling conditions can not be obtained. Because low yield wells are a reality, and contamination is not always located in high K_{sat} zones, the sampling of low yield wells is not prohibited by regulation and procedures for sampling them are found in EPA guidance.</p>
29	Fate and Transport Model	<p>The commenters state that the Fate and Transport Model (FTM) will be used to assess the performance of the long-term monitoring.</p> <p>The commenters further state that the FTM is</p>	<p>The comment is not relevant to the CMI Report.</p> <p>Monitoring of groundwater and the vadose zone will be conducted to assess the performance of the MWL – the NMED will not rely on the Fate and Transport Model or any other model in lieu of such monitoring.</p>

		<p>defective because groundwater below the MWL is presently contaminated with cadmium, chromium, nickel and nitrate, and probably PCE.</p> <p>The commenters also argue that the MWL may be contaminating groundwater with PCE to levels above the new EPA MCL of 0.05 µg/L.</p>	<p>Both the newly installed wells and the now-abandoned older wells at the MWL have demonstrated that the MWL has not caused any groundwater contamination. See also Comment Number 12. Thus, the fate and transport model has not been invalidated by any empirical data acquired since the model was developed.</p> <p>The EPA drinking-water MCL for PCE is 5µg/L, which is an enforceable standard. If the EPA has a MCL goal of 0.05 µg/L for PCE, such a goal is not a standard, and therefore is not enforceable (NMED is not aware that the EPA has such a goal). Regardless, PCE is not a groundwater contaminant at the MWL.</p>
30	Regulatory framework	<p>The commenter asserts that the MWL has been improperly classified as a Solid Waste Management Unit (SWMU), and that the MWL is really a “regulated unit” by definition under 40 CFR §.264.90(a). The commenter further states that the regulations at 40 CFR § 270.1 (c) requires that owners and operators of landfills that received waste after July 26, 1982 must have post-closure permits, unless they demonstrate closure by removal or decontamination or obtain an enforceable document in lieu of a post-closure permit. Additionally, if a post-closure permit is required, the permit must address groundwater monitoring, unsaturated zone monitoring, corrective action and post closure care requirements.</p> <p>The commenter asserts that a post closure permit has not been submitted for the MWL.</p>	<p>The comment is not relevant to the CMI Report.</p> <p>A hazardous waste operating permit does not exist and has never existed for the MWL. There is only limited permit language that applies specifically to the MWL under Module IV (Hazardous and Solid Waste Amendments) of the SNL Hazardous Waste Operating Permit. The SNL Hazardous Waste Operating Permit was issued for container storage of hazardous waste in excess of 90 days at the SNL Hazardous Waste Management Facility. Module IV is the corrective-action portion of said operating permit. The language in the HSWA module about the MWL concerns selection and implementation of the remedy for the MWL and long-term monitoring. It contains nothing about the operation of the landfill because the landfill never operated under provisions of the New Mexico Hazardous Waste Act and the New Mexico Hazardous Waste Management Regulations. In hazardous waste permits, it is common for corrective action requirements to be included in a HSWA module or specific corrective-action chapter of container storage or treatment permits because owner/operators of such facilities must by regulation conduct corrective action even at sites at the facility other than the permitted unit as necessary to protect human health and the environment (see 20.4.1.500 NMAC incorporating 40 CFR § 264.101(a)).</p> <p>The MWL is regulated as a Solid Waste Management Unit (SWMU) subject to corrective action pursuant to 20.4.1.500 NMAC incorporating 40 CFR§ 264.101. Its status as a SWMU was established over two decades ago by the U. S. EPA. The MWL is not an operating unit and is not a regulated unit as defined under 20.4.1.500 NMAC incorporating 40 CFR § 264.90(a), and is not subject to the post-closure permitting requirements of 20.4.1.500 NMAC incorporating 40 CFR § 270.1(c). The Permittee is not required to submit a post closure permit application for the MWL.</p> <p>However, the long-term monitoring and maintenance plan (LTMMP) for the MWL, once completed, is planned to eventually become a part of SNL’s Hazardous Waste Operating Permit due to the necessity for long-term controls for the landfill. The LTMMP will contain the same technical requirements for monitoring, inspection, and maintenance that would normally be included in a post-closure permit for a landfill. The LTMMP will be made available for public comment before it is finalized and implemented.</p>
31	NMED Budget	The commenter expressed their opinion that	The comment is not relevant to the CMI Report.

		it is important that NMED's budget is not cut any further. In their opinion, budget constraints have affected NMED's ability to protect the health, welfare and environment for people in New Mexico.	The NMED's budget is controlled by the State's legislative's branch of government. The commenter should consider directing their comment to the State senator and representative for their district.
32	Human Receptors	The commenter states that downstream and downwind of the MWL are the village of Mountain View and the Pueblo of Isleta. The commenter further states that these culturally diverse communities are being impacted by contaminants that NMED has failed to mitigate, and that community reports of cancer are reminiscent of hotspot outbreaks.	<p>The comment is not relevant to the CMI Report.</p> <p>The NMED strives to protect all citizens of New Mexico. The MWL does not pose a threat to citizens living in Mountain View, the Pueblo of Isleta, or any other community.</p> <p>NMED is not aware of any unusual occurrences or elevated frequencies of cancer in these communities.</p>
33	Agency Effectiveness	The commenter alleges that actions of the NMED have raised uncertainty that hazardous waste rules are being enforced and that drinking water is being protected. The commenter also expressed their opinion that such actions have encouraged other governmental agencies to allow polluters to escape prosecution and that regulators have been ineffective and incompetent.	<p>The comment is not relevant to the CMI Report.</p> <p>See Comment Number 12. NMED has vigorously enforced the New Mexico Hazardous Waste Management Regulations and has provided appropriate regulatory oversight to protect drinking-water resources in New Mexico.</p>
34	Information Requests	The commenter states that the Albuquerque Bernalillo County Water Utility Authority used national security as an excuse to keep public documents from their organization (Citizens for Environmental Safeguards). The information sought by their organization concerned drinking-water production wells that are potentially impacted by 8 million gallons of jet fuel that has been released at a Kirtland Air Force Base site.	<p>The comment is not relevant to the CMI Report.</p> <p>The comment concerns the Albuquerque Bernalillo County Water Utility Authority (WUA). The commenter should contact the WUA regarding this concern.</p> <p>NMED has considerable information on the Kirtland Air Force Base jet fuel spill (known as the Bulk Fuels Facility Spill). Much information about this fuel release is posted on the NMED's web site at: http://www.nmenv.state.nm.us/hwb/kafbperm.htm.</p>