

Permit

LAWL Consent Order  
modification  
Groundwater Monitoring Grouping  
and GEI submittal

Cobrain, Dave, NMENV

ENTERED

**From:** Joni Arends [jarends@nuclearactive.org]  
**Sent:** Monday, February 13, 2012 3:26 PM  
**To:** Kieling, John, NMENV; Cobrain, Dave, NMENV; De Saillan, Charles, NMENV;  
Rhgilkeson@aol.com; Jon Block; Mayer.Richard@epamail.epa.gov  
**Subject:** CCNS Comments in Opposition to DOE/LANL Proposed Class 1\* Mods to CO  
**Attachments:** f CCNS Class 1 CO 2-13-12.pdf; App to CCNS Class 1 CO 2-13-12.pdf

Dear John, Dave and Charlie,

Please find attached our comments in opposition to the DOE/LANS Class 1\* modification request to the March 2005 Consent Order and an Appendix for your review. Thank you for your patience with our electronic document problems. We look forward to your response to our comments.

Best,

Joni

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Joni Arends, Executive Director  
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By email to: [john.kieling@state.nm.us](mailto:john.kieling@state.nm.us)

John Kieling, Acting Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
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Re: Public Comments in Opposition to Proposed Class 1\* Modifications to  
March 2005 Compliance Order on Consent from Los Alamos National  
Laboratory, and

EP2012-0009 - General Facility Information Report and Scope of  
Groundwater Monitoring Plans, dated January 23, 2012

Dear Mr. Kieling:

Thank you for the opportunity to provide additional comments about the opposition by Concerned Citizens for Nuclear Safety to the proposed Class 1\* modifications to the March 2005 Compliance Order on Consent from the Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) for Los Alamos National Laboratory (LANL). We documented our opposition in our January 27, 2012 email to you and in the February 1, 2012 conference call with Dave Cobrain and Charles deSaillan. We filed our opposition to the New Mexico Environment Department (NMED) on January 27, 2012, the same day we were notified of the DOE/LANS request through the Electronic Public Reading Room.

The regulations at 40 CFR §270.42, Appendix I require NMED to deny the DOE/LANS requests for Class 1\* modifications. As discussed below, the proposed Scope of Groundwater Monitoring Plans should be classified as a Class 2 request, requiring public comment and opportunity to request a public hearing. The General Facility Information Report request should be denied.

**The General Facility Information Report Modification Request Must Be Denied.**

As we discussed in our conference call, providing accountability, transparency and an on-going record as required for the General Facility Information report is essential for the public now and in the future. The Consent Order is scheduled to expire on December 30, 2015. If NMED approves the proposed modification allowing for a triennial report as DOE/LANS requested, instead of an annual report, the next report would not be due until 2015. The new information about the work done between now and then must be documented in the now required annual reports.

It's in specific reports

Further, the Consent Order requires, in pertinent part, the "submittals are one-time submittals, unless new information becomes available. In that case, the affected submittals shall be updated and resubmitted annually." Consent Order, Section IV.A.2. The justification DOE/LANS provided to your agency states that such a change will "reduce the administrative burden for both NMED and DOE/LANS." The administrative burden falls on DOE/LANS and NMED **only** when "new information becomes available." New information is what the public, and hopefully NMED, wants to review.

For the public interest, NMED should deny the proposed Class 1\* modification to the Consent Order and stand firm for the annual General Facility Information report. 40 CFR §270.42 and 63 Fed.Reg. 56710, October 22, 1998, EPA 40 CFR Parts 264, 265, 270, and 271 - *Standards Applicable to Owners and Operators of Closed and Closing Hazardous Waste Management Facilities: Post-Closure Permit Requirement and Closure Process; Final Rule*. Conducting the cleanup at LANL in a manner consistent with EPA regulations and guidance requires no less.

correction not permit action

**The Scope of Groundwater Monitoring Plans Should Be Site-Specific.** CCNS agrees that the watershed approach for groundwater monitoring does not work and supports the site-specific approach. The DOE/LANS request, however, is not a Class 1\* modification request, but a Class 2 modification request, requiring public comment and opportunity to request a public hearing. Id. This is both a regulatory requirement - and an appropriate application of the EPA Guidance on public participation cited above.

Given the failures by both DOE/LANL and NMED to protect our groundwater, a public hearing is necessary in order to stop the unscientific practices and wasting time and money. It will also mean that NMED and DOE/LANL will be able to obtain reliable and representative samples in order to make scientifically based remedy selection decisions. For example, the two groundwater flow maps in the Material Disposal Area (MDA) G Corrective Measures Evaluation (CME), Rev. 3 have so many mistakes that no one trying to use them would know if the water flow direction at the water table and in the deeper RCRA "uppermost

aquifer" is to the southeast or to the northeast toward the Santa Fe Buckman well field and possibly the Buckman Direct Diversion Project.

The public must have the opportunity to request a public hearing about where the wells should be located, the drilling methods, the collection of samples, the need for long-term trend analysis, and the need for retraction of the unreliable data that has been collected for years from wells clogged with bentonite clay and organic drilling fluids. Only in this way can your agency assure that there is a correct approach to monitoring and public confidence in the entire monitoring process.

CCNS consulted with Robert H. Gilkeson, Registered Geologist, who prepared the Appendix to these comments. It is an analysis of why the site-specific approach is necessary and deviations from best practices have comprised all the groundwater monitoring on the Pajarito Plateau. It also references to earlier reports by the National Academy of Sciences, the Environmental Protection Agency and its Kerr Laboratory, and Robert H. Gilkeson, Registered Geologist, that recommended site-specific groundwater monitoring.

Please contact me with any questions and your replies to these comments. We look forward to your denial of the two proposed Class 1\* modifications and the designation of the groundwater monitoring plans as a Class 2 modification, with an opportunity for public comment and a hearing upon request.

Sincerely,

Joni Arends, Executive Director

cc: Rich Mayer, EPA Region 6 at Mayer.Richard@epamail.epa.gov

**Appendix to CCNS Public Comments in Opposition to Proposed  
Class 1\* Modifications to March 2005 Compliance Order on Consent from  
Los Alamos National Laboratory, dated January 23, 2012**

**National Academy of Sciences - Watershed Approach is Wrong.** An important conclusion in the National Academy of Sciences (NAS) 2007 Report titled *Plans and Practices for Groundwater Protection at the Los Alamos National Laboratory: Final Report* was that the watershed approach required by the NMED Consent Order did not follow good scientific practice. The pertinent excerpt on page 43 in the NAS report follows:

However, there are areas where the Interim Plan does not appear to follow good scientific practice. The most important of these is the focus on a watershed approach, where the monitoring plan for each watershed within LANL is developed and laid out individually in the Interim Plan. This structure, which is specified in the Consent Order, works quite well for monitoring surface base flows and alluvial groundwater that are confined to the canyons. However, it does not work well for the intermediate aquifers and even less for the regional aquifer [Emphasis Added].

**Given these facts, we ask:** (1) Why didn't the NMED stop requiring the use of the watershed approach when the NAS Report was issued in 2007? and (2) Why didn't the NMED recognize the watershed approach did not follow good scientific practice?

**The NMED practice of not requiring sealing borehole intervals drilled with organic additives has caused irreparable damage to many if not all of the new \$2.3 million monitoring wells installed for the NMED Consent Order.** The NMED allows DOE/LANS to use a very large volume of water-based organic drilling fluids for drilling deep into the vadose zone. The NMED requires LANS to stop using the organic fluids a distance of 100-150 ft above the estimated depth to the water table. But the NMED does not require the borehole intervals drilled with the organic fluids to be sealed with temporary or permanent casing before drilling proceeds into the regional aquifer. Now practically all of the water quality data from the new wells show irreparable damage to the sampling zones in the monitoring wells from the harmful organic fluids (see the discussion on long-term trends in the water quality data beginning on page 5 of this Appendix).

Further, the Environmental Protection Agency (EPA) Kerr Lab and EPA Region 6 described the need to seal the borehole intervals drilled with the organic fluids.

From page 15 in the EPA Kerr Lab February 10, 2006 Report titled *Impacts of LANL Hydrogeologic Characterization Well Construction Practices*:

Strive to drill boreholes using no bentonite or organic additives within screened intervals. Additives may be used in intervals above the target monitoring zone if telescoping casing constructions are used and the hole is adequately cleaned before drilling the final footage within the interval to be screened.

From page 4 in the September 4, 2009 EPA Region 6 memorandum from Richard Mayer regarding EPA's LANL Draft RCRA Permit Comments:

**Section 11.11.2.3, Page 163, Water Rotary and Mud Rotary:** EPA recommends that mud rotary methods not be used at LANL due to the well documented problems identified over the past 5 years. Additives may be used in intervals above the target zone if telescoping casing constructions are used and the hole is adequately cleaned before drilling the final footage within the interval to be screened [Emphasis Added].

**Given these facts, we ask:** (1) Why didn't the NMED implement the recommendation of EPA Kerr Lab and EPA Region 6 for DOE/LANS to seal the borehole intervals drilled with the large quantities of harmful water-based organic drilling additives? and (2) Why didn't the NMED and DOE/LANS review of the water quality data show the harm caused to the individual \$2.3 million monitoring wells by the harmful organic fluids that were allowed to flow into the sampling zones?

**Please Note:** Robert H. Gilkeson, Registered Geologist, advised LANL to not allow bentonite clay drilling muds and organic additives to flow into sampling zones in monitoring wells in 1997 when he was the lead contractor for installing monitoring wells. Gilkeson implemented correct air rotary casing advance drilling methods that were superior to the casing advance methods that are now used to drill the wells.

The NMED is now in the process of using a very expensive network of irreparably damaged "characterization wells" and "monitoring wells" for decisions on the site-specific remedy at the three RCRA regulated units, many legacy waste dumps, the TA-16 outfall, and the highly contaminated reach along Mortandad Canyon. The NMED Consent Order fails for the installation of the required networks of monitoring wells anywhere at LANL for knowledge of the nature and extent of groundwater contamination at this time and to provide detection of groundwater contamination in the future.

**The groundwater flow path maps in the most recent 2011 Corrective Measures Evaluation (CME) reports for the three RCRA regulated units at TA-54, which are Material Disposal Areas (MDAs) G, H and L. Those maps show that the site-specific requirements are not provided.**

- The wells are not in the proper location as required for a site-specific network at any of the regulated units.
- The LANL reports admit that many of the wells at MDA G do not provide accurate water level data for the elevation of the water table.
- The technical data provided in the LANL well rehabilitation reports show that the activities to rehabilitate the large number of LANL characterization wells was not successful. Nevertheless, the defective wells are incorrectly presented as reliable monitoring wells in the most recent CME reports for the three regulated units at TA-54.
- The review of long-term trends in the water quality data are irrefutable evidence that practically all of the LANL characterization wells and the new monitoring wells installed for the NMED Consent Order are damaged by the organic and bentonite drilling fluids. The long-term water-quality data show that almost all of the characterization wells and the monitoring wells installed for the Consent Order do not provide reliable and representative water samples as required by RCRA, the Consent Order and Permit. Permit Section 11.11.2 establishes the general requirements for design and construction of groundwater monitoring wells and includes a requirement that monitoring wells must produce representative groundwater samples.

Under Permit Section 11.11.2.3., the NMED may also require additional sampling and testing to ensure that the collected data are not affected by residual drilling fluids. The NMED has not enforced this requirement.

**Unfortunately, the unscientific assessment scheme that the NMED currently uses to determine the ability of the LANL characterization wells and monitoring wells to produce reliable and representative water samples is wrong.** The required unscientific assessment scheme in the NMED March 25, 2011 approval letter for the Interim Facility-Wide Groundwater Monitoring Plan follows:

Discontinue the usage of the Well Screen Analysis Report, Rev. 2 (LANL, May 2007) protocol for evaluating the residual effects of drilling products on the water quality data. Evaluation of the representativeness of water quality data from regional and perched intermediate wells must rely more on trends in field data collected during well purging; physical signs of potential problems with sample quality (e.g., odors, presence of foam or foreign objects, unusual color or turbidity); longer-term (one to

*Appendix to CCNS Public Comments in Opposition to Proposed Class 1\* Modifications to March 2005 Compliance Order on Consent from Los Alamos National Laboratory, dated January 23, 2012*

*\* February 13, 2012 \* Page 3*

three years) water quality trends; presence of chemical indicators of drilling products; anomalous data; and any other factors that might indicate impacts on the quality of water samples. For well screens, where representativeness of water quality data is questionable or has not yet been established (e.g., in newly constructed or rehabilitated wells), add dissolved total iron, dissolved total manganese, nitrate as nitrogen, total organic carbon, and sulfate to the list of field parameters that are measured during well purging. These additional field parameters must be collected at least once every casing volume of purged water.

This new NMED assessment scheme continues the scheme to mask contamination. Asking these questions continues the scheme: Does the water smell bad? Does the water look bad? Is the water foamy or contain chunks? The New Mexico Hazardous Waste Act, the Resource Conservation and Recovery Act and the public require samples from reliable and representative wells are collected. In order for the public to fully participate in the remedy selection regulatory processes, we must have reliable and representative samples from regulatory compliant wells.

The NMED was correct to require LANS to stop using the badly flawed LANL Well Screen Analysis Report (WSAR). The EPA Kerr Lab described the need to stop using the WSAR repeatedly in four reports issued over the years 2005 to 2009. **We ask: Why didn't NMED follow the recommendation of the EPA Kerr Lab in 2006 instead of the long delay to 2011?** The WSAR was only a study of water quality data and the EPA Kerr Lab February 10, 2006 Report on page 6 described why this scheme could not be used as follows:

Relative to addressing the question of whether ground-water samples are representative of the undisturbed aquifer chemistry, water quality data alone provide an unreliable indication of whether there is sustained impact to sediment sorption characteristics. The margin of error of determining, through measurements of water chemistry, what sediment minerals exist at any given point in time at a well screen is comparable to the level of uncertainty in estimating the temperature of a glass of water solely through visual observations.

From page 4 in the March 30, 2009 EPA Kerr Lab Report:

Using criteria established in this report [e.g., the LANL WSAR Revision 2 approved by the NMED on May 25, 2007], an undesirable component of uncertainty will persist regarding screen impacts because it is not possible to understand all possible mineral-contaminant interactions solely by evaluating water chemistry. . . The critical point is that the nature of the reactive iron mineralogy cannot be assessed by examining



water chemistry alone. In order to have a sense of the reactive nature of the aquifer solids, other testing would be required.

Now the new NMED assessment scheme is still only a study of water quality data after the reports from the EPA Kerr Lab that explained why this scheme does not work.

Further, Gilkeson wrote a report in 2004 that explained why the water quality data could not be used to determine that the LANL characterization wells had cleaned up to produce reliable and representative water samples. In 2004, Gilkeson presented his report to the NMED Hazardous Waste Bureau at a meeting that was attended by John Kieling, John Young and Dave Cobrain. At the meeting, Gilkeson was thanked for doing the work of the NMED.

**A serious issue is that the new NMED assessment scheme is not a scientifically correct study of the water quality data from the LANL wells.** An important omission is the failure of the NMED assessment to require a study of the long-term trends in the water quality data. The reports by the EPA Kerr Lab described the importance to study the long-term trends. From page 3 in the EPA Kerr Lab February 16, 2006 Report:

The well screen assessment only utilizes data from the most recent sampling rounds. . . it is recommended that this assessment also be applied to data obtained soon after well installation to determine whether previous geochemical conditions may have resulted in continuing sorption of contaminants. . . There is an additional concern regarding the use of only the three most recent measurements in these assessments without examination of trends that may be present. . . Examination of trends provides another line of evidence regarding the condition of impacted well screens and should be formally included in these evaluations [Emphasis Added].

In fact, the study of the long term trends in the water quality data provides irrefutable evidence that the majority of the characterization wells and monitoring well that pass the new NMED unscientific assessment scheme do not produce reliable and representative water samples and require replacement. **The study of the long-term trends is inexpensive and must be formally included in the assessment of the LANL wells.** Nevertheless, the wells that pass the study of the long-term trends in water quality still require expensive field tests to determine they produce reliable and representative water samples for detection of the LANL contaminants. This is because care was not taken to prevent harmful organic additives from flowing into the sampling zones.

The EPA Kerr Lab and the NMED Hazardous Waste Bureau identified the trace metal zinc as an appropriate analog for a preliminary evaluation of the ability of the LANL monitoring wells to produce reliable and representative water samples. From page 5 of the NMED April 9, 2007 letter directing changes to the assessment methodology in the LANL Well Screen Analysis Report (WSAR):

Zinc is considered to be an appropriate indicator for the adsorption behavior of metal cations and certain radionuclides (cesium-137, cobalt-60, europium isotopes, lanthanum-140 and neodymium-147) in the [WSAR] report.

Zinc occurs naturally in the regional aquifer and the concentrations of dissolved zinc in the *in situ* groundwater at a specific location do not change over time. The variation in dissolved zinc concentrations measured in water samples from a reliable monitoring well is because of the accuracy of the analytical method and should not vary by over plus or minus five percent (5%) of the actual concentration.

Some examples that the long-term trend for dissolved zinc is evidence that many of the LANL characterization wells and monitoring wells in the LANL 2011 CME Reports for the three regulated units require replacement are as follows:

**Characterization well R-21.** Well R-21 was drilled into the regional aquifer with organic drilling additives. The well is used as a reliable monitoring well in the CME reports and also in the unscientific badly flawed LANL Groundwater Background Investigation Report. The long term trend in the dissolved zinc data for well R-21 follows:

The first water sample was collected from well R-21 on March 31, 2004. Dissolved zinc was measured at concentrations ranging between 7.4 to 7.8 ug/L for three sampling events in 2004. But dissolved zinc declined to a value of 2.9 ug/L in a sample collected on June 6, 2005 and was not detected at less than 2 ug/L in a sample collected on August 20, 2007. From August 20, 2007 to the most recent sampling event on November 3, 2011, dissolved zinc was not detected in eleven of the eighteen sampling events including the most recent. The dissolved zinc concentrations in all water samples collected from well R-21 should have been in the range between 7.4 to 7.8 ug/L. The long-term decline in dissolved zinc at well R-21 is greater than 75%. Characterization well R-21 requires replacement.

**Mud-Rotary Characterization well R-23.** Well R-23 is described in the CME-Rev 3 as a reliable monitoring well for detection of groundwater contamination from MDA G. However, the long-term water quality data is irrefutable evidence that well R-23 is not a reliable monitoring well as follows:

The first water sample was collected from well R-23 on October 17, 2002. Dissolved zinc was measured at a concentration of 29.9 ug/L for a sampling event on March 23, 2004 but declined to 11.7 ug/L for the next sampling event on June 29, 2004. Dissolved zinc continued to decline and was not detected at less than 2 ug/L for sampling events on June 25, 2007 and September 06, 2007. From September 6, 2007 to the most recent sampling event on October 26, 2011, dissolved zinc was not detected in fourteen of the eighteen sampling events including the most recent sample. The dissolved zinc concentrations in all water samples collected from well R-23 should have been greater than 25 ug/L. The long-term decline in dissolved zinc at well R-23 is greater than 90%. Characterization well R-23 requires replacement.

**New NMED Consent Order Dual Screen Monitoring Well R-49 at MDA G.**

The CME Rev 3 describes Well R-49 as a reliable downgradient monitoring well close to MDA G for monitoring contamination at the water table. The well is cross gradient of MDA G and the long-term water quality data for dissolved zinc shows the upper screen in well R-49 does not produce reliable and representative water samples because of the harmful organic drilling additives that were allowed to flow into the sampling zone. The dissolved zinc data are as follows:

The first water sample was collected from the upper screen in well R-49 on February 19, 2009. Dissolved zinc was measured at a concentration of 28.1 ug/L for this sampling event and at a concentration of 23.3 ug/L for the second sampling event on March 12, 2009. Dissolved zinc declined to 3.5 ug/L on December 9, 2009 and was not detected beginning in a water sample collected on February 26, 2010. From February 26, 2010 to the most recent sample collected on October 27, 2011, dissolved zinc was not detected in six of the eight sampling events including the most recent sample. The dissolved zinc concentrations in all water samples collected from monitoring well R-49 should have been greater than 20 ug/L. The long-term decline in dissolved zinc in the upper screen at well R-49 is greater than 90%. The very expensive monitoring well R-49 requires replacement.

### **New NMED Consent Order Dual Screen Monitoring Well R-41 at MDA G.**

The CME Rev 3 describes Well R-41 as a reliable downgradient monitoring well close to MDA G. Because of mistakes on drilling the well, the upper screen is dry. The well is at a very important location but the long-term water quality data for dissolved zinc shows the lower screen in well R-41 does not produce reliable and representative water samples because of the harmful organic drilling additives that were allowed to flow into the sampling zone. The dissolved zinc data are as follows:

The first water sample was collected from the lower screen in well R-41 on April 1, 2009. Dissolved zinc was measured at an estimated concentration of 5.38 ug/L for this "April Fools" sampling event and at a lower estimated concentration of 3.4 ug/L for the second sampling event on April 2, 2009. Dissolved zinc was not detected in ten of the following eleven sampling events to the most recent sample collected on October 25, 2011. The long-term decline in dissolved zinc in the lower screen at well R-41 is greater than 90%. The very expensive monitoring well R-41 requires replacement because of the unreliable water quality data and other reasons.

### **New NMED Consent Order Single-Screen Monitoring Well R-39 at MDA G**

The CME Rev 3 describes Well R-39 as a reliable downgradient monitoring well close to MDA G for monitoring groundwater at the water table. However, the pumping test determined well R-39 monitors the deeper more productive aquifer zone. But the geologic log shows the well is installed in poorly productive strata at the top of the productive zone. Well R-39 is at an important location close to MDA G but mistakes in drilling the well require the well to be replaced. Further, the dissolved zinc data shows monitoring well R-39 does not produce reliable and representative water samples because of the harmful organic drilling additives that were allowed to flow into the sampling zone. The dissolved zinc data are as follows:

The first water sample was collected from well R-39 on February 19, 2009. Dissolved zinc was measured at a concentration of 28.1 ug/L for this sampling event and at a concentration of 23.3 ug/L for the second sampling event on March 12, 2009. Dissolved zinc declined to 7.5 ug/L for the third sampling event on June 9, 2009, to 3.5 ug/L for a sample collected on December 9, 2009 and was not detected beginning with the next water sample collected on February 26, 2010. From February 26, 2010 to the most recent sampling event on October 27, 2011, dissolved zinc was not detected in six of the eight sampling events including the

most recent. The long-term decline in dissolved zinc at well R-39 is greater than 90%. The monitoring well R-39 requires replacement.

**New NMED Consent Order Dual Screen Monitoring Well R-57 at MDA G.**

The CME Rev 3 describes Well R-57 as a reliable downgradient monitoring well close to MDA G. The well is at a very important location but the water quality data for dissolved zinc show the upper screen in well R-41 does not produce reliable and representative water samples because of the harmful organic drilling additives that were allowed to flow into the sampling zone. The dissolved zinc data in the upper screen for the four sampling events at the new monitoring well are as follows:

Zinc was not detected in the first water sample collected on July 1, 2010. Dissolved zinc was detected at 29.2 ug/L in the sample collected on May 9, 2011 and diminished to a concentration of 8.3 ug/L in the most recent sample collected on October 21, 2011. Dissolve zinc concentrations are expected to further decline in future samples because of the irreparable damage caused by the organic additives that flowed into the sampling zone. The expensive monitoring well R-57 requires replacement.

**For the three regulated units at TA-54, NMED is not requiring monitoring at the water table or in the RCRA "uppermost aquifer."** Figure E-3.3-2 in the CME, Rev. 3 shows that wells R-21, R-32 and R-39 are not monitoring the water table by LANL's own reports. And well R-41 is not good for anything by LANL's own reports and also by the NMED NOD for the LANL MDA G CME-Rev 2. The only well that may be possibly good from Area G is the upper screen in R-55, which is thousands of feet to the east of Area G. However, the pumping test data show the lower screen in well R-55 is installed in a "tight zone" and is not usable to detect groundwater contamination in the highly productive aquifer zone.

Well R-57 is the only downgradient monitoring well located close to MDA G that has a screen installed close to the water table. However, the borehole was not sealed and the harmful organic drilling fluids flowed into the sampling zone. The available water quality data presented above show that the upper screen in well R-57 does not provide reliable and representative water samples. NMED did not follow EPA and Kerr Lab requirements to seal off the boreholes - basic requirements of completing monitoring wells.

And characterization well R-23 is cross-gradient to MDA G, not in the direction of groundwater flow from MDA G, and is a distance of 3,000 feet to the southeast. Further, Well R-23 is a **mud-rotary "characterization well"** that NMED does not allow to be used as a monitoring well without "rehabilitation"

as described on page 31 in the NMED November 30, 2010 *General Response to Concerns of the Public*:

The NAS report references wells that were installed as part of LANL's groundwater characterization efforts that were conducted in accordance with their Hydrogeologic Work Plan (1998). As part of these efforts, a total of five regional aquifer characterization wells were installed at or near TA-54. These wells were not installed for contaminant detection or groundwater monitoring. Therefore, these wells have limited relevance to groundwater protection goals set forth by the March 1, 2005 Consent Order [Emphasis Supplied].

The five characterization wells installed in the regional aquifer at TA-54 include R-20, R-21, R-22, R-23 and R-32. The above statement is incorrect because the four characterization wells R-20, R-21, R-23 and R-32 are presented in the LANL MDA G CME Rev3 as monitoring wells that produce reliable and representative water samples for the contaminants of concern from the three RCRA regulated units MDA G, MDA L and MDA H. In addition, the omission of characterization well R-22 from the CME-Rev 3 is a serious issue because of the large number of RCRA contaminants that were detected in the groundwater samples collected from well R-22 in the first years of sampling. The LANL report, LA-UR-04-6777, September 2004, recognized the on-going contamination detected in the water samples produced from well R-22 as follows:

Thirty-one volatile and semi-volatile organic compounds have also been detected in water from well R-22. Only two of these, pentachlorophenol (1 detection, 6.2 ppb, MCL = 1 ppb) and benzo(a)pyrene (2 detections, 0.24 ppb, MCL = 0.2 ppb) were present at concentrations above the MCL. Monitoring for organic compounds at well R-22 will continue [MCL means Maximum Contaminant Level allowed in the EPA Drinking Water Standards].

A minimum of two new reliable monitoring wells are required at locations close to well R-22 to determine the nature and extent of groundwater contamination detected in the unreliable characterization well R-22.

The NMED made a mistake to order LANS to perform expensive activities to rehabilitate the three characterization wells R-20, R-22 and R-32. The MDA G CME Rev 3 incorrectly claims that the rehabilitation was successful for the two mud-rotary wells R-20 and R-32.

The expensive rehabilitation should not have been ordered by NMED in the first place. Before the "rehabilitations" were performed, Gilkeson and CCNS provided reports to document why rehabilitation was going to be a waste of

time, resources and energy. **And Michael Barcelona, technical expert for CCNS at the hazardous waste permit hearing, stated:**

Bentonite clay and organic drilling muds should never be used in the vicinity of well screens because development efforts rarely are successful particularly when there is excessive mud loss during drilling (R-32 screen one, 2 tons of mud lost) [See Table 4-5 in LANL WSAR-2].

However, the LANL Workplan for R-Well Rehabilitation and Replacement (LA-UR-06-3687, June 2006) accurately described the requirement to recover all of the bentonite clay drilling mud from the screened interval. The pertinent excerpt from the LANL report follows:

"If not completely removed by subsequent development, bentonite can serve as both a source of ions to groundwater as well as a sink for sorbing cations and organic species (p.3.)"

**The two groundwater flow maps in the MDA G CME-3 have so many mistakes that we don't know if the water flow direction at the water table and in the deeper RCRA "uppermost aquifer" is to the southeast or to the northeast toward the Santa Fe Buckman well field and possibly the Buckman Diversion.** In fact, the NMED recognizes the great uncertainty in the direction of groundwater travel away from MDA G on page 25 in the NMED NOD for the CME-REV 2 as follows:

The Permittees acknowledge uncertainties regarding the direction of groundwater flow near the northeast corner of MDA G and the level of hydraulic connectivity between well R-41 and the rest of the regional aquifer. The water table map in Figure E2.3-1, which represents of conceptual models of groundwater flow near MDA G, implies that groundwater pathways from the northern part of MDA G will not be monitored by any of the existing wells downgradient of MDA G. In addition, if well R-41 is not hydraulically connected to the regional aquifer and the water table map in Figure E-23.-1 represents actual groundwater flow regime, most of potential groundwater contaminants from MDA G might escape detection [Emphasis Added].

Additional information on groundwater flow directions and hydrogeology near the northeast corner of MDA G is necessary to assure reliable groundwater monitoring for MDA G and to determine the functionality of well R-41. Present a work plan to the installation of one or more regional aquifer monitoring wells near the northeast corner of MDA G, with a focus on verifying geology, hydraulic properties and groundwater flow directions in that area, and on complementing the

existing monitoring well network. The work plan must be submitted to NMED in accordance with the dates provided at the end of this NOD.

From the end of the NMED NOD for the MDA G CME-Rev 2 on pages 27-28:

The Permittees must address all comments herein and submit a revised CME Report by **August 31, 2011**. . . A work plan for installation of one or more regional aquifer monitoring wells near the northeast corner of MDA G must also be submitted to NMED no later than August 31, 2011 and the well(s) completed no later than **April 30, 2011** (see Comment 68) [Emphasis Added].

**It was a serious mistake for the NMED to require LANS to submit the MDA G CME Rev 3 before the installation and the collection of groundwater samples for the appropriate period of time from the new monitoring wells installed near the northeast corner of MDA G.** After all, the NMED assured the public on many occasions and described in regulatory documents to LANS that the selection of a remedy at MDA G would depend on reliable groundwater data. That data does not exist for MDA G at this time. From page 3 in the July 26, 2010 NMED NOD for the LANL MDA G CME-Rev2:

NMED has, on several occasions, informed the Permittees that selection of a remedy at MDA G would depend on reliable groundwater data. The Permittees have not provided an accurate description of the groundwater conditions beneath MDA G in accordance with Section XI.F.6.b of the Order, and therefore have not met the requirements set forth in Section VII.D.2 (specifically numbers 4,5 and 7).

**The groundwater monitoring program has been a failure and a waste of time, energy and resource.** It is time for the NMED and DOE/LANS to follow the direction of the statutes and regulations for groundwater protection and the advice of Registered Geologist Robert H. Gilkeson, the National Academy of Science, EPA Region 6 and the EPA Kerr Laboratory. The public must have the opportunity to have a public hearing about where the wells should be located, the drilling methods, the collection of samples, and the need for long-term trend analysis.