

Permit 3/19/10



STATE OF NEW MEXICO
BEFORE THE SECRETARY OF ENVIRONMENT

IN THE MATTER OF:)
)
APPLICATION OF THE UNITED STATES)
DEPARTMENT OF ENERGY AND)
LOS ALAMOS NATIONAL SECURITY LLC)
FOR A HAZARDOUS WASTE FACILITY)
PERMIT FOR LOS ALAMOS NATIONAL)
LABORATORY, and the)
NOTICE OF INTENT TO DENY A PERMIT)
FOR OPEN BURN UNITS TA-16-388 AND)
TA-16-399 FOR LOS ALAMOS NATIONAL)
LABORATORY.)
_____)

Nos. HWB 09-37 (P)
HWB 10-04 (P)
Consolidated



TESTIMONY OF DAVID COBRAIN

My name is Dave Cobrain, and I am a Staff Manager with the New Mexico Environment Department (the Department) Hazardous Waste Bureau Permits Management Program. I am presenting this testimony on behalf of the Department in the hearing concerning the issuance of a renewal permit for storage and treatment of hazardous waste at Los Alamos National Laboratory (LANL or LANL Facility). In particular, I will be discussing the corrective action requirements in Part 11 of the Proposed Permit, dated February 2, 2010. This testimony is marked as **NMED Exhibit 132**.

I. BACKGROUND AND EXPERIENCE

I have worked for the Department's Hazardous Waste Bureau for approximately 11 years. I am responsible for the preparation, issuance and enforcement of operating and post-closure care permits and corrective action orders for ten RCRA facilities that include LANL, military bases and testing facilities, refineries and the NASA White Sands Test Facility and also formerly used defense sites. Four permits and two orders have been prepared either by myself or



under my direction that contain provisions that are either similar or the same as those in Section 11 of this Permit. I drafted the equivalent sections of the March 1, 2005 Compliance Order on Consent (Consent Order) (NMED Ex. 26) for investigation and cleanup of environmental contamination at the LANL Facility, as well as the November 26, 2002 imminent hazard order on which the Consent Order was based. I have been directly responsible for its implementation since it went into effect.

Prior to my employment with Department, I had ten years experience as a consulting geologist working for environmental and engineering firms located in Oregon and Wyoming conducting environmental site investigations and remediation projects at industrial and commercial sites and for state and municipal agencies. As a consulting geologist I conducted all phases of site investigation and remediation at contaminated sites including subsurface explorations, sampling of soil, water and air for field and laboratory analyses, implementation of pilot tests for the purpose of characterizing the subsurface and testing remediation systems and directed remediation projects ranging from source removal to the design, installation and monitoring of in-place remediation systems. I also arranged for management and disposal of waste generated during corrective action activities and negotiated with regulatory agencies and industry on behalf of clients to achieve compliance with applicable environmental regulations.

I received a B.S. degree in economics from Utah State University and a M.S. degree in geology from the University of North Carolina at Chapel Hill. I am a Registered Professional Geologist in Oregon and Wyoming. I am an environmental professional as defined in 40 CFR §312.10.

A copy of my vita is **NMED Exhibit 133**. It is accurate and up-to-date.

II. SUMMARY

I will explain the substance of each of the permit conditions contained in Part 11 of the Proposed Permit, which addresses corrective action. I will also provide the basis for each requirement.

III. INTRODUCTION

The Permit Part 11 conditions address corrective action for releases of hazardous waste and hazardous constituents to the environment at the Facility. Corrective action is comprised of all activities related to environmental site investigation, cleanup and monitoring, including the reporting of contaminant releases and the actions taken to mitigate and remove or reduce contamination in environmental media such as soil or groundwater that has been affected by a contaminant release.

Title 40 CFR §§ 264.100 and 101 require the owner or operator of a hazardous waste treatment, storage or disposal facility to conduct corrective action as necessary to protect human health and the environment. The regulation at 40 CFR §§ 264.100 covers “regulated units,” meaning a landfill, surface impoundment, waste pile, or land treatment unit “that receives hazardous waste after July 26, 1982.” 40 CFR § 264.90(a)(2). The regulation at 40 CFR § 262.101 covers all solid waste management units, meaning any discernible unit “at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste.” 55 Fed. Reg. 30798, 30874 (July 27, 1990).

The U.S. Environmental Protection Agency (EPA) has developed an administrative approach to corrective action to address releases of hazardous waste and hazardous constituents into the environment from hazardous waste treatment, storage, and disposal facilities. In 1990, EPA proposed a rule (55 Fed. Reg. 30798, July 27, 1990) that included detailed requirements for

the implementation of corrective action as part of 40 CFR 264 subpart S. In 1993, EPA promulgated as final regulations a portion of Subpart S addressing the management of wastes created by corrective action. However, the detailed corrective requirements proposed in 1990 were not included. In 1994, EPA issued detailed corrective action guidance. (*RCRA Corrective Action Plan*, OSWER Directive 9902.3-2A, 1994) (**AR 9614**). EPA published an advance notice of proposed rulemaking on May 1, 1996 (61 Fed. Reg. 19432) that provided further guidance on corrective action as a follow-up to the 1990 proposed subpart S rule. EPA withdrew the corrective action provisions of the 1990 subpart S proposal in 1999 (64 Fed. Reg. 54604). However, EPA considers the 1990 proposed rule and, primarily, the 1996 Advance Notice of Proposed Rulemaking as guidance for implementing corrective action. 64 Fed. Reg. at 54607; see Memorandum from Elliott P. Laws, EPA Assistant Administrator, Office of Solid Waste and Emergency Response (Jan. 17, 1997), (**NMED Exhibit 134, AR 33270**). The corrective action procedures included in this Permit follow the procedures included in the 1990 proposed rule, the 1996 advance notice, and EPA guidance.

EPA, and other scientific and engineering organizations have also developed technical methods and procedures to ensure that valid data are generated to adequately characterize releases of contaminants and to demonstrate that such releases are remediated to levels that are protective of human health and the environment.

The requirements of Part 11 are generally derived from 40 CFR Part 264 and EPA and American Society of Testing and Materials (ASTM) guidance and technical documents generated by federal agencies, such as the U.S. Geological Survey and the U.S. Army Corps of Engineers.

IV. PART 11 PROVISIONS

A. **Permit Section 11.1 – Corrective Action Requirements under the Consent Order**

Permit Section 11.1 (*Corrective action Requirements under the Consent Order*) gives background information concerning the March 1, 2005, Compliance Order on Consent (as updated) (NMED Ex. 26, AR 32111), which governs corrective action at all Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at LANL. This section states that the Consent Order is an enforceable document under 40 CFR §§ 264.90(f) and 264.110(c) and that the Proposed Permit does not make any change to the Consent Order.

The Consent Order addresses Facility-wide investigation and cleanup of releases of contaminants to the environment that have occurred since research and development of nuclear weapons and other related operations began at LANL in 1943. The Consent Order requires corrective action at all identified SWMUs and AOCs. SWMUs and AOCs are sites where there has been a known or suspected release of contaminants to the environment resulting from either deliberate or unintentional activities related to Facility operations. The Consent Order covers all site investigation, cleanup, monitoring and reporting for the units subject to corrective action.

B. **Permit Section 11.2 – Corrective Action Requirements under the Permit**

Permit Section 11.2 (*Corrective Action Requirements under the Permit*) describes the circumstances in which corrective action is to be conducted under the Permit, rather than under the Consent Order. There are four exceptions to the coverage of the Consent Order, where site investigation, cleanup, and monitoring are to be conducted under the hazardous waste Permit (See Consent Order §§ III.W.1 and III.W.2).

The Proposed Permit regulates corrective action in instances expressly excluded from the Consent Order. The four circumstances are: (1) new releases and newly discovered releases

from hazardous waste management units (in the Consent Order labeled as “operating units”), (2) closure and post-closure care of hazardous waste management units, (3) implementation of controls for any solid waste management units or areas of concern which have been listed as having corrective action complete with controls, and (4) releases occurring or discovered after the Consent Order terminates. (*See* Consent Order § III.W.1)(NMED Ex. 26, AR 32111). The same four items are listed in Permit Section 11.2. All other corrective action is covered by the Consent Order, until it is terminated.

The first circumstance is new releases and newly discovered releases from hazardous waste management units. Hazardous waste management units are defined in Permit Part 1. They are units that have been used to treat, store or dispose of hazardous waste and that are permitted to manage such waste. The Applicants must conduct corrective action, as necessary, to address new releases or newly discovered releases of hazardous waste or hazardous constituents from these units in accordance with this Permit.

The second circumstance is closure and post-closure care of hazardous waste management units. Specific requirements for closure and post-closure care are contained in Part 9 of the Proposed Permit, based on the regulations in 40 CFR Part 264, Subpart G. These requirements include preparation of closure and post-closure plans, removal and decontamination of equipment, structures and soils, cleanup to an established performance standard, and monitoring of environmental media and the maintenance of engineering controls, as necessary. Although referenced in the Consent Order, and in this Permit Section, there are closure and post-closure care requirements that are distinct from corrective action requirements. Ms. Rebecca Cram is presenting testimony on the closure requirements in the Proposed Permit.

The third circumstance is implementation of controls for any solid waste management units or areas of concern which have been listed as having corrective action complete with controls. Cleanup of environmental media affected by the operations at a hazardous waste management unit are subject to corrective action requirements included in this Permit Part. Implementation of any controls, including long-term monitoring, for SWMUs or AOCs where corrective action is complete is also covered by this Permit Part. Such controls may include maintenance of an engineered cover or maintenance of a fence to restrict access.

The fourth circumstance is releases occurring or discovered after the Consent Order terminates. The cleanup work under the Consent Order is scheduled to be completed by 2015. (Consent Order § III.E.2). Implementation of corrective action to address releases of contaminants that occur or are discovered after the date on which the Consent Order terminates also are subject to the requirements included in this Permit Part.

In addition, under Permit Section 11.2, corrective actions conducted to address releases from hazardous waste management units that commingle with releases originating from other sources (SWMUs or AOCs) are subject to cleanup under the Consent Order as authorized by 40 CFR § 264.110(c).

Permit Section 11.2.1 (Identification of SWMUs and AOCs Requiring Corrective Action), refers to, and incorporates, lists of SWMUs, AOCs, and hazardous waste management units at the LANL Facility. The SWMUs and AOCs are listed based on their status, as defined in 68 Fed. Reg. 8757-64 (Feb. 23, 2003). The three categories listed for units subject to corrective action as discussed in this Federal Register notice are (1) units requiring corrective action (site investigation and/or cleanup), (2) units where corrective action is complete without controls,

which allows for unrestricted land use, and (3) units where corrective action is complete but monitoring, restrictions on land use or engineering controls are required.

C. Permit Section 11.3 – General Conditions

Permit Section 11.3 (*General Conditions*) contains a series of general conditions on implementation of corrective action

Permit Section 11.3.1 (*Groundwater Monitoring*), governs groundwater monitoring at the regulated units. It is in accordance with 40 CFR §§ 264.90 through 264.100. Solid waste management units subject to the corrective action under 40 CFR § 264.101 and hazardous waste management units that meet the definition of a “regulated unit” described in 40 CFR § 264.90(a)(2) are subject to groundwater monitoring requirements, as described in 40 CFR § 264.90(a)(1). A regulated unit includes land disposal units that received waste after July 26, 1982, such as Material Disposal Areas (MDAs) G, H, and L at TA-54.

At TA-54, MDAs G, H, and L are co-located with units subject to investigation and cleanup under the Consent Order, as shown in our maps (NMED Ex. 83, NMED Ex. 84, and NMED Ex. 85). The Applicants are conducting investigations, under the Consent Order, to characterize groundwater across the LANL Facility and in the vicinity of the specific regulated units concurrently. Releases of contaminants have occurred, and it is not possible to distinguish the source of the releases as being from the regulated units or one or more SWMUs or AOCs (see 40 CFR § 90(f)(1)). The Department can design alternative requirements for groundwater monitoring and corrective action to those in 40 CFR §§ 264.91 through 264.100 that will be equally protective. The alternative requirements are those that are being implemented under the Consent Order, together with corrective action requirements under this proposed Permit.

Since releases from the regulated units are commingled with those from other solid waste management units, combining groundwater investigation and monitoring necessary for closure or

post-closure care with corrective action for solid waste management units is the most efficient approach and is authorized by 40 CFR §§ 264.90(f) and 264.110(c).

The groundwater monitoring requirements for regulated units at the LANL Facility, if implemented separately, would overlap with, and sometimes duplicate, the groundwater characterization, remediation and monitoring required by the Consent Order. Groundwater beneath the entire LANL Facility is currently being investigated and monitored under the Consent Order. A Facility-wide groundwater monitoring network is being installed in conjunction with groundwater investigations. The groundwater monitoring network at the LANL Facility is continually being modified as new information is obtained, as the quality of groundwater quality data is re-evaluated in light of new information and as the characteristics and spatial extent of subsurface rock strata is better defined by additional subsurface investigations. The groundwater monitoring network at TA-54, where the regulated units are located, is still in the investigation stage, and the locations for detection monitoring wells are subject to change. The changes are related to new and sometimes unexpected subsurface conditions being encountered during investigation activities.

Facility-wide groundwater monitoring at TA-54 and across the LANL Facility is currently being conducted utilizing the existing groundwater monitoring network under an interim groundwater monitoring plan, required by the Consent Order, while a groundwater monitoring network is established that is capable of detecting releases from the regulated units and other potential sources across the entire LANL Facility.

This Permit section (Permit Section 11.3.1) requires the Applicants to conduct groundwater monitoring for all regulated units, as defined in 40 CFR § 264.90(a)(2), and to coordinate such monitoring with the ongoing groundwater monitoring conducted under the

Consent Order and any future Department-approved Long-term Groundwater Monitoring Plans for the Facility. The purpose of such coordination is to address the multiple sources of existing groundwater contamination beneath the LANL Facility and the potential sources of groundwater contamination being investigated under the Consent Order. In addition, a Facility-wide approach is necessary to aid in source identification once a release is detected.

The subsurface conditions at the LANL Facility are relatively unique. The top of the regional (main) aquifer in the vicinity of the hazardous waste management units at TA-54 is 800 to 1000 feet below the ground surface. The disposal units are located on a mesa that is approximately 150 higher than the adjacent canyons. Contaminants migrating between the ground surface and the regional aquifer can be diverted in unanticipated directions by fractures, rock strata with varied characteristics and slopes, and groundwater perched within rock strata at elevations above the regional aquifer that may flow in directions that are different from the general flow direction of the regional aquifer. Because of these conditions, the Department has required the Applicants to characterize groundwater beneath the LANL Facility using an approach that is most likely to detect contaminants released by facility operations. Part of this approach includes installing wells at distances from regulated units that are greater than those specified in 40 CFR §264.95 (at the unit boundary in the direction of groundwater flow) because of the possibility that contaminants may not migrate in a direct vertical path from the source to the regional aquifer. This approach is based on evidence from groundwater investigations conducted at other portions of the laboratory. An example of this characteristic of subsurface conditions is indicated by the presence of chromium at concentrations approximately ten times the New Mexico groundwater quality standard in perched aquifer well SCI-2, while chromium is not detected in regional aquifer well R-43, installed adjacent to well SCI-2.

In addition, the Applicants must comply with the groundwater cleanup standards specified in Permit Section 11.4.1 and Section VIII of the Consent Order at all locations beneath the Facility and not only at the point of compliance specified in 40 CFR §264.95.

Permit Section 11.3.1.1 (*Notification of Detections*) also requires timely notification of initial detections of contaminants, concentration trends that indicate that an ongoing release is occurring, and detections of contaminants at concentrations that exceed groundwater cleanup standards. Timely notification of detections of contaminants in groundwater is essential to taking appropriate action to prevent further migration of contamination and to mitigate such releases.

Permit Section 11.3.1.2 (*Source Identification and Corrective Action*) requires the Applicants to report detections and to determine that the source is from a regulated unit or another source. If the source of the release is from a regulated unit, the Applicants must determine the nature and extent of the release and contain or otherwise mitigate the release.

Permit Section 11.3.2 (*Corrective Action Reporting*) requires periodic reporting of groundwater monitoring results and allows for such reporting to be included with the periodic groundwater monitoring reports required by the Consent Order. Groundwater monitoring reports that include surrounding areas place the results of monitoring under the permit in context with the rest of the Facility.

Permit Section 11.3.3 (*Corrective Action Beyond the Facility Boundary*) directs the Applicants to notify the Department and to implement corrective action beyond the facility boundary in the event a release migrates outside the LANL Facility. San Ildefonso Pueblo, Santa Clara Pueblo, Santa Fe County, Bandelier National Monument, Santa Fe County, and the Rio Grande are located down stream and down gradient from the Facility. This section requires the

Applicants to notify the Department upon discovering that a release of hazardous waste or hazardous constituents has migrated beyond the LANL Facility boundary, or has the potential to migrate beyond the Facility boundary, and to implement corrective action beyond the Facility boundary as necessary to protect human health and the environment. This requirement is authorized by 40 CFR § 264.101(c).

Permit Section 11.3.4 (*Off-Site Access*) requires the Applicants to use their best efforts to obtain access to property outside the LANL Facility to conduct corrective action, if necessary. The Applicants must notify the Department if such access is denied by the property owner. This requirement is authorized by 40 CFR § 264.101(c).

Permit Section 11.3.5 (*Newly Discovered Releases*) requires the Applicants to notify the Department of discovery of any previously unknown release of hazardous waste or hazardous constituents into soil, sediment, surface water, or groundwater. The Department will determine whether corrective action is necessary and direct the Applicants with regard to further work. This requirement is in accordance with 40 CFR 270.14(d)(2), and the EPA Hazardous and Solid Waste Amendments (HSWA) Model Permit, Section M (1995), which is (NMED Ex. 114). A similar provision is in Sections V.C and V.D of the Consent Order (NMED Ex. 26).

Permit Section 11.3.6 (*Field Activities*) requires notice to the Department of field sampling or other field activities. The Department requires the ability to monitor field activities to ensure that technical standards for data collection are met and to collect split samples to verify that the data are valid, as required by 40CFR §264.97(d) The Applicants are to allow the Department to collect split samples upon request. This requirement is consistent with HSWA Model Permit Section O (NMED Ex. 33151) and Consent Order Section III.O (NMED Ex. 26).

Permit Section 11.3.7 (*Health and Safety Plan*) requires the Applicants to prepare site-specific health and safety plans for all field activities. Such plans to protect site personnel and contractors are required by OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 or 29 CFR 1926.65, paragraph (b)(4). The requirement is included under the Department's omnibus authority, 40 CFR § 270.32(b)(2).

Permit Section 11.3.8 (*Recordkeeping*) requires the Applicants to maintain records of all corrective action activities for a minimum of three years after the end of the operating life of the Facility and a minimum of three years after the end of any post-closure care periods. This requirement is authorized by 40 CFR 264.97(j). This requirement also is included in Consent Order (NMED Ex. 26) Section III.Q and 40 CFR 264.97(j).

D. Permit Section 11.4 – Cleanup Levels

Permit Section 11.4 sets the standards for cleanup of contaminated environmental media, primarily groundwater, surface water, and soil. A primary part of environmental cleanup is the establishment of contaminant concentration levels that are protective of human and ecological receptors. EPA relies upon toxicological studies to develop risk-based cleanup levels based on the additional risk or hazard to a population posed by the presence of a contaminant. The cleanup levels in the Proposed Permit are based on federal and State regulatory standards, and they follow Department and EPA guidance. They are the same as the cleanup levels that the Department has applied at other facilities in the State, for example, in the hazardous waste facility permits for the U.S. Army White Sands Missile Range, the NASA White Sands Test Facility, the U.S. Army Fort Wingate Depot Activity, and the Mixed Waste Landfill at Sandia National Laboratories; the proposed hazardous waste permits for Kirtland Air Force Base, and Sandia National Laboratories; and the Administrative Order for the Western Refining Company

Bloomfield Refinery. They are also virtually identical to the cleanup levels in the March 1, 2005 Consent Order for LANL, Section VIII (NMED Ex. 26).

The cleanup levels in Permit Section 11.4 are based, in most instances, on target hazard or risk levels for protection of human health. The goals are a human health target excess risk level of one excess cancer incidents per 100,000 population (1×10^{-5}) for carcinogens and a Hazard Index of 1.0 for non-carcinogens. Hazard is a measure used to evaluate the potential for noncancer health effects, such as organ damage, from chemical exposure. Hazard consists of a comparison of an estimated chemical intake (dose) with a reference dose level below which adverse health effects are unlikely. A hazard quotient is expressed as the ratio of the estimated intake to the reference dose for an individual chemical. A hazard index is calculated if more than one chemical is present. A hazard index is the additive value of more than one hazard quotient. Risk is calculated to evaluate the potential effects of carcinogenic compounds. Risk is calculated based on the potential for excess incidence of cancer within a population exposed to a carcinogenic compound and is typically expressed as the number of excess incidences of cancer per unit population (usually number of incidences per 10,000, 100,000 or 1,000,000 individuals). Risk for multiple compounds is calculated by adding the number of excess incidences per population for each carcinogenic compound present. Risk assessment is further discussed in connection with Permit Section 11.10.

The cleanup levels established by the Department and the New Mexico Water Quality Control Commission (WQCC) are based on a human health target risk level of 10^{-5} for carcinogenic substances (one excess cancer risk of 1 in 100,000) and a Hazard Index (HI) of 1.0 for non-carcinogenic substances. Ms. Paige Walton discusses these concepts in somewhat greater detail in her testimony.

The Department has relied on the following regulations and guidance to establish the cleanup levels discussed in this section: Water Quality Control Commission (WQCC) regulations at 20.6.2.WW NMAC, 20.6.2.3103 NMAC, 20.7.10 NMAC; federal Safe Drinking Water Act [42 U.S.C. §§ 300f to 300j-26], Maximum Contaminant Levels (MCLs); EPA *Risk Assessment Guidance for Superfund* 1989 as updated through 2009 (**NMED Exhibit 135, AR 9488**), NMED, *Technical Background Document for Development of Soil Screening Levels* (2009) (**NMED Exhibit 136, AR 31882**) NMED *Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment* (2009) (**NMED Exhibit 137, AR 13306**); and NMED, *Assessing Ecological Risks Posed by Radionuclides: Screening-Level Radioecological Risk Assessment* (2008) (**NMED Exhibit 138, AR 9803**).

Permit Section 11.4.1 (*Groundwater Cleanup Levels*) specifies cleanup levels that are in accordance with WQCC groundwater quality standards and federal MCLs. The cleanup levels that have been established for contaminants in groundwater under this permit are the lower (more protective) of the levels established from the following sources: (1) the WQCC groundwater quality standards listed in 20.6.2.3103 NMAC, (2) the cleanup levels for toxic pollutants calculated in accordance with 20.6.2.7.WW NMAC, and (3) the drinking water maximum contaminant levels (MCLs) adopted by EPA under the federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26).

If no cleanup level has been established for a detected contaminant, the most recent version of the Department's Tap Water Screening Levels listed in the Department's guidance document entitled *Technical Background Document for Development of Soil Screening Levels* (2009) (NMED Ex. 136) must be used to establish the cleanup level. In the absence of a Department tap water screening level, the EPA *Regional Screening Levels for Chemical*

Contaminants at Superfund Sites (RSLs) for tap water must be used. If no groundwater standard has been established for a contaminant, but toxicological information is published, the Applicants must calculate a cleanup level based on a target excess cancer risk level of 10^{-5} for carcinogenic substances and a Hazard Index of 1.0 for non-carcinogenic substances. This hierarchy of cleanup levels ensures that any applicable cleanup level required by the Permit meets, or is more stringent than, the target risk levels established through New Mexico regulation.

Permit Section 11.4.1.1 (*Groundwater Cleanup Level for Perchlorate*) addresses perchlorate. Perchlorate is a relatively newly identified contaminant at LANL. The Proposed Permit establishes an action level for perchlorate that is the same as that required by Section VIII.A.1.a of the Consent Order (NMED Ex. 26). The Applicants are required to determine the nature and extent of perchlorate contamination should concentrations of perchlorate be detected at 4 $\mu\text{g/l}$ (micrograms per liter) or greater. This section contains the same requirement as Consent Order Section VIII.A.1.a. (NMED Ex. 26).

Permit Section 11.4.2 (*Soil and Sediment*) establishes the cleanup levels for soils and sediments.

Permit Section 11.4.2.1 (*Soil Cleanup Levels*), specifies soil-screening levels that are based on a cancer risk of 10^{-5} and a hazard index of 1.0 for the applicable land use scenario. These levels are protective of human health and the environment. The cleanup levels for soil and sediments are established in NMED's *Technical Background Document for Development of Soil Screening Levels* (2009) (NMED Ex. 136), which calculates potential human exposures to contaminants based on land use. Cleanup levels may be adjusted based on the type of receptors (e.g., a child in a residential setting, a construction worker, an industrial worker). The

Applicants must consider the potential for migration to groundwater if conditions indicate that there is a potential for groundwater to be affected. The Department generally considers cleanup to levels protective for residential land use as the cleanup goal for sites undergoing corrective action.

If the Applicants are unable to achieve such cleanup levels, they must conduct a risk assessment to establish site-specific cleanup levels, using the methods described in Permit Section 11.10. The Department's *Technical Background Document for Development of Soil Screening Levels* (2009) (NMED Ex. 136) follows EPA's *Risk Assessment Guidance for Superfund* 1989 (as updated) (NMED Ex. 135).

Permit Section 11.4.2.2 (Soil Polychlorinated Biphenyls Cleanup Levels) establishes a default cleanup level for polychlorinated biphenyls (PCBs) in accordance with the Department's guidance *Risk-based Remediation of Polychlorinated Biphenyls at RCRA Corrective Action* (2000) (**AR 9800**). The guidance also establishes procedures to conduct a risk assessment specific to PCBs. The same requirement is included in Section VIII.B.1.a of the Consent Order.

Permit Section 11.4.3 (*Surface Water Cleanup Levels*) requires the Applicants to comply with the surface water quality standards established in the Clean Water Act (33 U.S.C. §§ 1251 to 1387), the New Mexico WQCC Regulations (20.6.2 NMAC), and the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) to protect human and ecological receptors and prevent migration of contaminants beyond the LANL Facility boundary.

E. Permit Section 11.5 – Ecological Risk Evaluation

Permit Section 11.5 (*Ecological Risk Evaluation*) specifies the guidelines for screening-level evaluation of ecological risk. The Applicants must evaluate impacts of contaminants to ecological receptors and remediate contaminated media to levels that protect ecological receptors. Ecological risk is determined by evaluating the effects of exposure of a set of animal

and plant receptors to identified contaminants, based on data from toxicological studies. Ecological risk assessment uses the same benchmarks of a risk of 1×10^{-5} excess risk for carcinogenic compounds and a hazard index of 1.0 for noncarcinogenic compounds. Ecological risk is discussed in more detail in connection with Permit Section 11.10.5. The requirements of this section are in accordance with the following guidance: (1) LANL Ecological Screening Levels, which are included in LANL's *Screening Level Ecological Risk Assessment Methods*, (as approved by the Department) (**AR 13894**); (2) New Mexico Environment Department *Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment, Revision 2.0* (July 2008) (NMED Ex. 137); (3) U.S. EPA's ECO-SSLs (**AR 14206**); and (4) New Mexico Environment Department *Assessing Ecological Risks Posed by Radionuclides: Screening-Level Radioecological Risk Assessment* (2001) (NMED Ex. 138).

F. Permit Section 11.6 – Variances from Cleanup Levels

Permit Section 11.6 (*Variance from Clean-up Levels*) authorizes the Applicants to request a variance from cleanup levels if conditions exist at a site that make achievement of cleanup levels impracticable.

Permit Section 11.6.1 (*Water Quality Standards*) allows the Applicants to request a variance from WQCC water quality standards by application to the WQCC for an alternative abatement standard.

Permit Section 11.6.2 (*Other Cleanup Levels*) allows application to the Department for a variance from another cleanup level. Examples of such conditions include contamination present at depths that present prohibitive engineering hazards or an unacceptable risk of explosion during removal of buried waste. An impracticability demonstration must follow EPA's *Interim Final Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration* (September 1993) (**NMED Exhibit 139, AR 33197**) and *Handbook of Groundwater Protection*

and Cleanup Policies for RCRA Corrective Action (AR 30763), and must be approved by the Department.

G. Permit Section 11.7 – Permit Modification for Corrective Action Complete

Permit section 11.7 (*Permit Modification for Corrective Action Complete*) allows a class 3 permit modification to request to change the status of a Solid Waste Management Unit or Area of Concern listed on Proposed Permit Table K-1 “corrective action required” to Proposed Permit Table K-2 “corrective action complete.” These tables are in Attachment K to the Proposed Permit. Such modification would be subject to a public process under 40 CFR § 270.42 and 20.4.1.901 NMAC. The permit modification process includes preparation of a statement of basis by the Department to support the corrective action is complete determination. Corrective action may be deemed complete with or without controls. Controls on a corrective action complete determination may include groundwater monitoring and long-term monitoring and maintenance of remedies (*e.g.*, landfill covers, remediation systems) and land use restrictions. See 68 Fed. Reg. 8757 (Feb. 25, 2003) and 20.4.2.7.J NMAC.

H. Permit Section 11.8 – Corrective Action Procedures

Permit Section 11.8 (*Corrective Action Procedures*) describes the procedures for the conduct of corrective action. Corrective action begins with discovery and assessment of a release and continues through remedy completion and any necessary long-term monitoring. Corrective action includes not only field investigation and remediation activities but also historical research, records maintenance, laboratory analyses, work plan and report preparation, and the implementation of interim measures to prevent migration of contaminants and mitigate immediate threats to human health and the environment. Corrective action is required by 40 CFR 264.100 and 101 to investigate and clean up releases of contaminants, as necessary, to protect human health and the environment at hazardous waste management units, solid waste

management units and areas affected by off-site migration of contaminants. The EPA 1990 proposed Subpart S Rule, which EPA subsequently withdrew but continues to use as guidance, included detailed corrective action procedures. 55 Fed. Reg. 30798, 30873-81 (July 27, 1990). The procedures in Proposed Permit Section 11.8 follow this guidance, as well as the 1996 advance notice of proposed rulemaking, which EPA also uses as guidance. 61 Fed. Reg. 19432 (May 1, 1996).

Corrective Action Process

Permit Sections 11.8.1.1 (*Release Assessment Report*) and 11.8.1.2 (*Requirement to Proceed*) describe the requirements for a release assessment report, should the Department request one. Corrective action typically begins with notification to the Department by the Applicants of discovery of a contaminant release or of a site where there is a potential for a release based on historic use. Release assessment (Permit Section 11.8.1.1) – Release assessments are the first phase of site characterization and typically includes the Applicants providing to the Department available information on the location, topography, historical use of the site and surrounding areas and dates of operation. The information may include any data related to previous environmental investigations or collected upon initial discovery and geologic and hydrogeologic information. If the Department determines the need for further action the Applicants will be directed to submit Investigation Work Plan.

Permit Sections 11.8.2 (*Department-Initiated Interim Measures*) and 11.8.3 (*Permittees-Initiated Interim Measures*) set forth the conditions for initiating interim measures. If there is an immediate threat of migration of contamination or to human health or the environment then the Applicants will initiate interim measures or the Department will direct the Applicants to implement interim measures to mitigate such a threat.

Permit Section 11.8.4 (*IM Work Plan Requirements*) describes the requirements for preparation and implementation of interim measures work plans, and reporting on the completion of interim measures.

Once discovery of a release is reported to the Department, as in a release assessment report (Permit Section 11.8.1.1), the Proposed Permit requires a relatively standard process that is designed to identify, characterize and, if necessary, remediate contaminated sites. The primary steps in the corrective action process are described below:

Investigation Work Plan (RCRA Facility [RFI] Work Plan) (Permit Section 11.8.5)

– Upon notification from the Department, the Applicants must prepare a work plan to investigate the site to determine the nature and extent of contamination and the potential pathways of contaminant releases to the air, soil, surface water, and ground water. The investigation may include all or some of the following activities: collection of surface and subsurface soil samples for field screening and laboratory analyses, drilling and well installation for the purpose of sampling groundwater or subsurface pore gas, collection of surface water samples to evaluate for the presence and concentrations of contaminants. The investigation also may include periodic groundwater, surface water or subsurface pore gas monitoring and collection of data to determine the characteristics of soils, rock and aquifers beneath the site, and to explore for buried features such as waste disposal areas, underground structures or pipelines or natural features.

Investigation Report (RFI Report) (Permit Section 11.8.5) - The results of site investigation activities implemented under the investigation work plans are summarized in Investigation Reports that present the results and conclusions of the investigations and make recommendations regarding the need for further corrective action.

Permit Section 11.8.5.3 requires the Applicants to attain the cleanup levels required by Permit Sections 11.4 and 11.5. If the Applicants are unable to attain the cleanup levels, they must conduct a risk assessment to establish alternate cleanup levels that are protective of human health and the environment based on reasonably foreseeable future land use.

Upon review of the investigation report, if the Department determines the need for evaluation of remedial alternatives to accomplish cleanup of a contaminated site, the Department will direct the Applicants to submit a Corrective Measures Evaluation.

Corrective Measures Evaluation (Corrective Measures Study) (Permit Section 11.8.6) – Upon notification from the Department, the Applicants must prepare an evaluation of remedial options that are capable of achieving the applicable cleanup levels. The evaluation must discuss the short and long term effectiveness of each remedy and also the cost, implementability and the ability of each remedial alternative to reduce the toxicity mobility and volume of contamination. The corrective measures evaluation must also include a preliminary design for each proposed remedy, information related to operation and maintenance required for each remedy, monitoring requirements, including groundwater monitoring and a discussion of the protectiveness of the remedial alternatives.

Based on the information provided in the corrective measures evaluation, the Department will select a remedy or remedies, prepare a statement that explains the basis for the selection, and provide for public comment and the opportunity to request a hearing in accordance with 20.4.1.901 NMAC.

Upon selection of a remedy, the Department will direct the Applicants to submit a Corrective Measures Implementation Work Plan to execute the selected remedy(ies) in accordance with Permit Section 11.8.7.

Corrective Measures Implementation (CMI) Work Plan (Permit Section 11.8.7.1) – the Applicants must submit a detailed work plan for implementation of the selected remedy to the Department for approval. The plan must include the proposed design of the remedy and any associated monitoring systems, contaminant removal activities, a schedule for construction and completion of all remediation and monitoring systems, and all proposed testing, maintenance and monitoring necessary to monitor the effectiveness of the remedy.

Progress Report (Corrective Measures Implementation (CMI) Report) (Permit Section 11.8.7.4) – Upon completion of remedy implementation, the Applicants must submit a report summarizing all activities related to remedy implementation that includes as-built drawings of all construction completed to implement the remedy and the results of initial performance testing and monitoring of remediation systems and the monitoring network. The Applicants must conduct long-term monitoring and maintenance of the implemented remedy to demonstrate its effectiveness and to demonstrate the remedy is protective of human health and the environment. Long-term monitoring includes operation and maintenance of remediation systems and other engineering or institutional (*e.g.*, land use) controls and groundwater, surface water or air monitoring. The Department determines the schedule for monitoring and reporting on the performance of the implemented remedy.

Remedy Completion (Permit Section 11.8.8) - Upon completion of the selected remedy, the Applicants must submit a report to the Department for approval that summarizes the remedy implementation and demonstrates that the remedy is complete based on monitoring, additional sampling of contaminated or previously contaminated media, or other means to demonstrate the successful reduction in toxicity, mobility and volume of contamination to cleanup levels. Upon approval of remedy completion the Department may approve cessation of

all or a portion of the required long-term monitoring, engineering controls or institutional controls.

That concludes my discussion of the primary steps in the corrective action process.

Permit Section 11.8.9 (*Accelerated Clean-up Process*) provides that, as part of the corrective action process for small sites with simple cleanup requirements, the Applicants may choose to implement corrective measures on an accelerated schedule. Permit Section 11.8.9 provides the procedures and time limits to conduct accelerated corrective actions.

I. Permit Section 11.9 – Approval of Submittals

Permit Section 11.9 (*Approval of Submittals*) provides that all documents submitted to the Department are subject to review and approval pursuant to Permit Section 1.9.18.

J. Permit Section 11.10 – Methods and Procedures

Permit section 11.10 (*Methods and Procedures*) introduces a section in which the Department specifies, for the sake of consistency and completeness, the methods of carrying out investigations and reporting on their results. The discussion here generally does not address individual sections in detail.

Methods and procedures have been developed by government and industry for all phases of corrective action. EPA, the American Society of Testing and Materials (ASTM), the U.S. Geological Survey (USGS) and other federal agencies, state agencies, and the environmental and engineering industries have generated standard techniques for field data collection, hydrologic characterization, sample analyses and data assessment processes. The methods and procedures included in this Permit section are based primarily on EPA guidance and USGS, ASTM and standard industry practices.

The purpose of this section is to establish minimum requirements for field investigations and monitoring to provide accurate data for the evaluation of site conditions, determining the nature and extent of contamination and contaminant migration, and remedy selection and implementation. The methods discussed do not include all methods that may be necessary to fulfill the requirements for corrective action. The methods for conducting investigations, cleanup, and monitoring at the Facility must be determined based on the conditions and contaminants that exist at each location.

The permit requirements in Permit Section 11.10.2 through Permit Section 11.10.2.13 are included to provide consistency in corrective actions at facilities across the state and to improve the quality and reliability of technical data acquired during site investigation and remediation activities. The Department does not make decisions related to compliance with environmental regulations without technically valid data. The Department requires all regulated facilities to use generally accepted practices for site characterization and remediation when conducting corrective action. The Applicants are required to use the methods and procedures included in this section or provide justification for the use of alternate methods. The Department requires the Applicants to describe their proposed methods in each work plan rather than citing standard operating procedures (SOPs) or guidance, to make clear that the methods are appropriate and specific to the proposed work and site conditions. The Department also requires the Applicants to report the methods and procedures actually used, to verify that acceptable methods were used and to account for deviations from procedures proposed in approved work plans due to unanticipated conditions.

The Department's purpose is to ensure the validity and consistency of environmental investigation and data collection by: 1) providing minimum requirements for subsurface exploration and sample collection; 2) providing minimum requirements for sampling of the

target media (*e.g.*, soil, groundwater); 3) providing minimum requirements for characterization and monitoring of groundwater and unsaturated zone conditions; and 4) identifying minimum required screening, analytical, and field and laboratory quality assurance procedures.

Quality assurance procedures include: 1) the level of data quality necessary to achieve the investigation objectives; 2) the requirements for quality control/quality assurance (QA/QC) to be followed during field investigations and by the analytical laboratories; and 3) the methodology for the review and evaluation of the field and laboratory QA/QC results and documentation.

Field investigations conducted to evaluate for the presence, nature and extent of contamination must meet a standard of due diligence that allows the Department to make regulatory determinations concerning sites where releases have, or may have, occurred. Because time and resources to characterize sites are not unlimited, the Department requires the Applicants to investigate such sites by investigating locations where contamination is most likely to be present in order to make inferences concerning the nature and extent of contamination. This process is often accomplished by using a phased approach, using data acquired in previous investigations to target likely areas where contamination may have migrated or to collect data to confirm the limits of contaminant migration. Due to the surface conditions, co-located Laboratory facilities, and the complexities of geology and hydrogeology beneath the Facility, site characterization often requires investigations that evolve as new information is acquired. The methods and procedures required by this section not only establish a baseline for site characterization but also require the Applicants to sample at specific intervals or locations or to adequately explain the rationale for their approach to site-specific investigations and monitoring if they differ from the approach required by this Permit section.

Subsurface characterization and sampling methods must be designed to obtain accurate information about site conditions. Investigation methods must be selected to minimize impacts to the media being sampled and still be capable of meeting the data collection objectives for the project. The investigation, data collection and QA/QC requirements of this section are in accordance with EPA and ASTM guidance and industry-accepted practices for environmental site assessments.

Information and data related to environmental site evaluations must be valid and defensible and also capable of demonstrating compliance with environmental regulations. This Permit includes requirements derived from scientific research that is documented in guidance, which has been developed primarily for environmental site assessment and cleanup and is intended to provide a consistent approach to environmental data acquisition.

Assessment of soils and rock include drilling or excavation to collect samples to assess the subsurface based on the characteristics of the soils or rock and the type of known or suspected contaminant release. The method of soil boring must be chosen based on the type of material that the boring will be advanced into and the type of contaminants to be investigated. The Permit requirements for subsurface exploration in Permit Section 11.10.2.2 through 11.10.2.14.i are in accordance with the guidance provided in ASTM D 6286-98, *ASTM Standard Guide for Selection of Drilling Methods for Environmental Site Characterization* (1998) (**NMED Exhibit 140, AR 33097**), ASTM D 5092-02 *ASTM Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers* (2002) (**NMED Exhibit 141, AR 33100**) and EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (**NMED Exhibit 142, AR 9580**).

As part of investigation of soils and rock, samples must be collected for classification, field screening for the presence of contaminants, and submittal to chemical analytical laboratories for testing for the target contaminants. The type of sampling device used must be designed to provide, to the extent possible, a relatively undisturbed sample to prevent loss of contaminants, provide sufficient volume for testing and allow for classification of the soil or rock properties and observations of variation across the sample interval. The requirements of Permit Section 11.10.2.4.ii and 11.10.2.4.iii are derived from EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex 142), ASTM D 4700-91 *Standard Guide for Soil Sampling from the Vadose Zone* (1991) (NMED Exhibit 143, AR 33091) and ASTM D 6169-98 *Standard Guide for Selection of Soil and Rock Sampling Devices Used with Drill Rigs for Environmental Investigations* (1998) (NMED Exhibit 144, AR 33090).

The logging and soil and rock description requirements included in Permit Section 11.10.2.4.v follow EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex 142), ASTM D2487 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* (NMED Exhibit 145, AR 33094) and ASTM 2488 *Standard Practice for Description and Identification of Soils (Visual Manual Procedure)* (NMED Exhibit 146, AR 33093).

Field screening is used to assist in determining the extent of explorations and aid in the selection of samples for further analyses. Field screening is conducted using field instrumentation, visual observations and field test kits to provide preliminary information related to the extent and type of contamination and to aid in determining when the media being sampled is most representative of the actual site conditions. The field screening requirements in Permit Section 11.10.2.4.vi and 11.10.2.4.vii follow ASTM D 5314-92 *Standard Guide for Soil Gas*

Monitoring in the Vadose zone (1992) (NMED Exhibit 147, AR 33092), ASTM D 6452-99 *Standard Guide for Purging Methods for Wells Used for Ground-Water Quality Investigations* (1999) (NMED Exhibit 148, AR 33087), and ASTM D 5903-96 *Standard Guide for Planning and Preparing for a Groundwater Sampling Event* (1996)(NMED Exhibit 149, AR 33098).

Site investigations require precise location and elevation data because the slope of strata in the subsurface and the direction of flow of groundwater may not be easily discernable. It also aids in evaluation of regional trends across the Facility. The Permit requirements for surveying in Permit Section 11.10.2.5 are in accordance with EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142) and location surveys must comply with Sections 500.1 through 500.12 of the Regulations and Rules of the Board of Registration for Professional Engineers and Surveyors Minimum Standards for Surveying in New Mexico (12.8.2 NMAC).

Contaminants may be released to the environment in the vapor phase. Vapor-phase contaminants may potentially affect groundwater or migrate into buildings and present a threat to human health. The Permit (Permit Section 11.10.2.6) requires investigation and monitoring of subsurface air quality to evaluate the fate and transport of vapor-phase contamination. The requirement for such monitoring are based on ASTM D 5314-92 *Standard Guide for Soil Gas Monitoring in the Vadose zone*(1992) (NMED Ex. 147) and U.S. Army Corps of Engineers (USACE) *Soil Vapor Extraction and Bioventing Engineer Manual* (EM-1110-1-4001, June 2002) (AR 32184).

Groundwater quality is a primary concern of the Department, and both the WQCC and EIB have established groundwater quality regulations in addition to those established by EPA. Groundwater investigation and monitoring are essential elements of environmental site

assessments and cleanup actions at many sites affected by releases of contaminants to the environment. This Permit Section 11.10.2.7 contains requirements for groundwater monitoring, sampling and testing in accordance with EPA guidance, ASTM guidance and standard practices for aquifer characterization.

The direction of groundwater flow is important to evaluate for contaminant migration, to target groundwater investigation locations, and to ensure the protection of water supply wells. The permit requires that the elevations of the top of groundwater aquifers determined to a precision of 0.01 foot (Permit Section 11.10.2.7.i) to precisely calculate the direction of groundwater flow in accordance with EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142).

Groundwater sampling includes purging wells to ensure that the sample collected is representative of existing aquifer conditions, measurement of water characteristics using field instruments and field test kits to confirm that those conditions have been achieved and to collect data on the aquifer characteristics (*e.g.*, water temperature, dissolved oxygen concentration, nitrate concentration) prior to collection of samples for laboratory analyses. The permit requirements for these activities at Permit Section 11.10.2.7.i, 11.10.2.8 through 11.10.2.8.iv are in accordance with EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142), ASTM D 5903-96, ASTM *Standard Guide for Planning and Preparing for a Groundwater Sampling Event* (1996) (NMED Ex. 149), ASTM D 6634-01 *Standard Guide for the Selection of Purging and Sampling Devices for Groundwater Monitoring Wells* (2001) (NMED Exhibit 150, AR 33086), ASTM D 6771-02 *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations* (2002) (NMED Exhibit 151, AR 33099), ASTM D 6452-99 *Standard Guide for Purging Methods for*

Wells Used for Ground-Water Quality Investigation (1999) (NMED Ex. 148), and ASTM D 5088-02 *Standard Practices for Decontamination Procedures of Field Equipment Used at Waste Sites* (2002) (NMED Exhibit 152, AR 33095).

In the Department's approval (Approval with Modifications, dated November 12, 2008) of the Applicants' 2008 Interim Facility-wide Groundwater Monitoring Plan (May 2008), the Applicants were required to purge a minimum of three well volumes prior to sample collection in all wells that contain pumps that are completed in the intermediate perched and regional aquifers. The Department subsequently required the Applicants to conduct tests to evaluate the efficacy of pumping wells designed for passive sampling to assess the validity of data collected from these types of wells (NMED *Requirement to Perform Reliability Assessment of Multi-Screened Westbay Wells*, February 11, 2010) (NMED Ex. 35).

The validity of samples of any media must be verified by the preparation and testing of both field and laboratory quality assurance/quality control (QA/QC) samples. The purpose of QA/QC testing is to verify that the instruments used are functioning correctly and to verify that the equipment used to collect and test the samples are appropriate to achieve the objectives of the sampling and are not contaminated by other sources. The requirements in Permit Section 11.10.2.8.iv are in accordance with EPA's *Contract Laboratory Guidance for Field Samples* (OSWER 9240.0-44 EPA 540-R-07-06, July 2007) (NMED Exhibit 153, AR 33069) and EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142) and EPA SW 846: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1980, as updated) (NMED Exhibit 154, AR 33077).

Care must also be taken to prevent cross-contamination during collection and handling of samples in the field and to ensure that proper chain-of-custody procedures are followed to protect

the integrity of the data collection process. The permit, in Permit Section 11.10.2.9, Sample Handling, requires the Applicants to follow sample handling and management processes in accordance with EPA's guidance provided in EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142) and *Contract Laboratory Guidance for Field Samples* (OSWER 9240.0-44 EPA 540-R-07-06, July 2007) (NMED Ex. 153) and EPA SW 846: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1980, as updated) (NMED Ex. 154).

Proper sample collection and management requires that measures be taken to ensure that cross contamination does not affect samples and also is protective of human health, including posing a threat to workers involved with environmental site work. The permit, in Permit Section 11.10.2.11, requires that decontamination of equipment used during field activities be conducted in accordance with EPA's *RCRA Groundwater Monitoring: Draft Technical Guidance* (1992) (NMED Ex. 142) and ASTM D 5088-02 *Standard Practices for Decontamination Procedures of Field Equipment Used at Waste Sites* (2002) (NMED Ex. 152).

Subsurface characterization and evaluation of remedies may require aquifer testing or pilot testing of remediation systems to assess their potential for achieving cleanup objectives at contaminated sites. The Permit requires in Permit Section 11.10.2.10 that such testing be designed to characterize subsurface conditions using industry-accepted methods such as those described in *Groundwater and Wells*, (F. Driscoll, 1986) (**AR 9425**), U.S. Geological Survey Water Supply Paper 2220, 1983 (**NMED Exhibit 155, AR 33114**), USACE, Soil Vapor Extraction and Bioventing (EM 1110-1-4001, June 2002) (AR 32184) and EPA's How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites A Guide for Corrective Action Plan Reviewers (OSWER 5401G EPA 510-R-04-002, May 2004) (**NMED**

Exhibit 156, AR 33153).

Valid and accurate laboratory testing is essential for determining whether concentrations of contaminants present in environmental media pose a threat to human health or the environment. All owner and operators of permitted hazardous waste facilities are required to perform detailed chemical and physical analyses of representative waste samples (40 CFR § 264.13). Analyses must “contain all the information which must be known to treat, store, or dispose of the waste” in accordance with 40 CFR § 264.13(a)(1).

These regulations require specific sampling and analytical procedures to be followed to ensure reliable monitoring results. “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846 (NMED Ex 154), is incorporated by reference into the hazardous waste regulations (40 CFR §260.11). SW-846 and additional EPA, state and industry standards establish quality control procedures necessary to ensure acceptable sensitivity, accuracy and precision of chemical analyses used to support hazardous waste compliance decisions. The provisions of Permit Section 11.10.3 through 11.10.3.5 are in accordance with applicable hazardous waste management regulations and scientifically accepted practices for producing reliable analytical results.

Permit Section 11.10.3 requires the Applicants to use accredited environmental testing laboratories employing updated EPA and industry-accepted analytical methods and procedures. These methods must be appropriate for the type of sample and required sensitivity. The requirements of this section are typical for environmental compliance permits. (*EPA Test Methods for Evaluating Solid Waste – Physical/Chemical Methods EPA/SW-846, 3rd Edition* (1986 through update IV January 2008) (NMED Ex 154), *EPA Requirements for Quality Assurance Project Plans* (2001) (**NMED Exhibit 157, AR 33111**), National Environmental

Laboratory Accreditation Conference, *Environmental Laboratory Accreditation Standard* (2003) (NMED Exhibit 158, AR 33115).

Permit Section 11.10.3 requires that detection limits for each method be less than applicable background, screening, and regulatory cleanup levels. The Department recognizes that cleanup levels for hazardous constituents may be revised based on new toxicological data and that laboratory methods must be developed or improved to lower analytical detection limits. Further, the Department prefers method detection limits to be as low as possible but no more than a maximum of 20 percent of the cleanup, screening, or background levels. Analyses conducted with detection limits that are greater than applicable background, screening, and regulatory cleanup levels are considered as data quality exceptions unless an analytical method has not yet been devised or validated that is capable of achieving the required detection limit. The Applicants are required to provide the reasons for elevated detection limits to the Department.

Permit Section 11.10.3.1 requires the Applicants to meet minimum quality assurance and quality control (QA/QC) requirements for laboratories producing permit-related analytical data. The use of standards, blanks, surrogates, duplicates, matrix spikes and other QA/QC as described is standard procedure for accredited environmental testing laboratories [EPA *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods*, EPA/SW-846, 3rd Edition (1986, as updated) (NMED Ex. 154), EPA 2001: *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003 (March 2001) (NMED Ex. 157) and National Environmental Laboratory Accreditation Conference (NELAC), *Environmental Laboratory Accreditation Standard*, EPA/600/R-04/003 (July 2003) (NMED Ex. 158)].

Permit Section 11.10.3.2 requires the Applicants to review project data to ensure compliance with applicable EPA, method and industry-accepted standards for preparing and evaluating QA/QC data. This includes timely notification of Facility and Department personnel of any critical QA/QC exceptions that may be corrected within specified holding times or other time limits. The requirements of this section are in accordance with the procedures included in *EPA Test Methods for Evaluating Solid Waste – Physical/Chemical Methods*, EPA/SW-846, 3rd Edition (1986, as updated), EPA 2001 (NMED Ex. 154): *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003 (March 2001) (NMED Ex. 157) and National Environmental Laboratory Accreditation Conference (NELAC), *Environmental Laboratory Accreditation Standard*, EPA/600/R-04/003 (July 2003) (NMED Ex. 158)].

Permit Section 11.10.3.3, Blanks, Field Duplicates, Reporting Limits, and Holding Times, requires the Applicants to review field QA/QC data to ensure compliance with data quality objectives for system cleanliness and precision. This section also requires method reporting limits to be well below applicable environmental standards or decision levels and that analyses be conducted within established holding times. The requirements of this section are in accordance with the procedures described in *EPA Test Methods for Evaluating Solid Waste – Physical/Chemical Methods*, EPA/SW-846, 3rd Edition (1986, as updated) (NMED Ex. 154), EPA 2001: *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003 (March 2001) (NMED Ex. 157) and National Environmental Laboratory Accreditation Conference (NELAC), *Environmental Laboratory Accreditation Standard*, EPA/600/R-04/003 (July 2003) (NMED Ex. 158).

Permit Section 11.10.3.4, Representativeness and Comparability, requires the Applicants to implement procedures to ensure representativeness and comparability of analytical results

following procedures specified in EPA *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods*, EPA/SW-846, 3rd Edition (1986, as updated) (NMED Ex. 154), EPA 2001: EPA *Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003 (March 2001) (NMED Ex. 157) and National Environmental Laboratory Accreditation Conference (NELAC), *Environmental Laboratory Accreditation Standard*, EPA/600/R-04/003 (July 2003)] (EPA 1986, EPA 2001, NELAC 2003) (NMED Ex. 158).

Permit Section 11.10.3.5, Laboratory Reporting, Documentation, Data Reduction, and Corrective Action, requires the analytical laboratories to formally review and validate project analytical data. Data validation is used to ensure that all project data meets applicable QA/QC objectives. The requirements of this section are in accordance with EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, (OSWER 9240.1-45, EPA 540-R-04-004, October 2004) (NMED Exhibit 159, AR 33112) and EPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, (EPA-540-R-08-01, June 2008) (NMED Exhibit 160, AR 33113).

K. Permit Section 11.11 – Monitoring Well Construction Requirements

Mr. Jerzy Kulis, Environmental Scientist with the Department's Hazardous Waste Bureau is presenting testimony on the monitoring well construction requirements in Permit Section 11.11.

L. Permit Section 11.12 – Reporting Requirements

Permit Section 11.12, Reporting Requirements, requires that work plans and reports discussing corrective actions provide the necessary information regarding the level of contamination known or suspected at a site and both explain proposed or conducted activities and provide adequate information for the Department to make decisions regarding compliance with cleanup requirements.

The Department receives plans and reports from regulated facilities that vary widely in quality and content and that often do not provide all of the information necessary for a full evaluation of the particular phase of corrective action discussed in the document. The Department reviews all corrective action documents and provides comments, to the submitting facility, that direct them to provide technically adequate information to address deficiencies within the document and conduct further work, as necessary to complete corrective actions. In order to streamline the review process and to decrease the type and volume of comments and revisions related to submittals, the Department includes a section on reporting requirements in permits and orders.

This section is not intended to specify reporting requirements for every potential corrective action; therefore, the formats for all types of reports are not included. The described formats include the general reporting requirements and formats for site-specific investigation work plans, investigation reports, periodic monitoring reports, risk assessment reports, and corrective measures evaluations, which are the equivalents of RCRA Facility Investigation (RFI) work plans, RFI reports, periodic monitoring reports, risk assessments, Corrective Measures Study (CMS) plans, and CMS reports listed in EPA's *RCRA Corrective Action Plan*, (1994) (AR 9614). The document titles differ from those listed in EPA's *RCRA Corrective Action Plan* because the formats included in this section do not directly follow the scope of work provided in the EPA guidance but better reflect Department information requirements and are intended to eliminate unnecessary repetition.

This section does not include all report sections that may be necessary to complete each type of report listed and may include sections that are not relevant for a specific phase of work.

The Applicants may submit variations of the general report format in outline form to the Department for approval.

This section of the permit requires that work plans and reports provide information on the site designation and ownership, the history of site use and the results of previously conducted environmental investigations, the known surface and subsurface conditions, a listing of the scope and methods of work conducted or proposed and a discussion of the applicable regulatory criteria. Documents that discuss completed or proposed work must include a discussion of analytical testing, field measurements and observations and QA/QC results. All documents must have the necessary summary tables and figures to aid in presenting data for proposed or completed corrective actions.

This concludes my testimony.

I, David Cobrain, swear under penalty of perjury that the foregoing is true and correct.



David Cobrain
Staff Manager
Hazardous Waste Bureau
New Mexico Environment Department
Santa Fe, New Mexico

Subscribed and sworn to before me this 19th day of March, 2010 by David Cobrain



Notary Public

My commission expires: April 3, 2011