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Permit

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**STATE OF NEW MEXICO  
ENVIRONMENT DEPARTMENT**

**COMPLIANCE ORDER ON CONSENT  
U.S. DEPARTMENT OF ENERGY  
Los Alamos National Laboratory**

**June 2016**

**(Modified February 2017)**



# LANL COMPLIANCE ORDER ON CONSENT

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## I. JURISDICTION

Each Party enters into this Consent Order pursuant to the following authorities:

A. The New Mexico Environment Department (NMED) issues this Consent Order to the U.S. Department of Energy (DOE or Respondent) pursuant to Section 74-4-10 of New Mexico's Hazardous Waste Act (HWA). This Consent Order is also issued under Section 74-9-36(D) of New Mexico's Solid Waste Act (SWA) and 20.9.9.14 NMAC, for the limited purpose of addressing the corrective action activities, including requirements, concerning groundwater contaminants listed at 20.6.2.3103 New Mexico Administrative Code (NMAC), toxic pollutants listed at 20.6.2.7.WW NMAC, and Explosive Compounds as defined herein. Although DOE consents to SWA jurisdiction for enforcement of the corrective action activities, including requirements, of this Consent Order relating to groundwater contaminants listed at 20.6.2.3103 NMAC, toxic pollutants listed at 20.6.2.7.WW NMAC, and Explosive Compounds, DOE otherwise reserves any and all rights, claims, and defenses with respect to the applicability of the requirements of the SWA, including the defenses enumerated in Section 74-9-34.

B. DOE enters into this Consent Order pursuant to its authorities and responsibilities under the Atomic Energy Act of 1954 (AEA), as amended, 42 U.S.C. § 2011 *et seq.*

C. The requirements of this Consent Order do not apply to radionuclides, including, but not limited to, source, special nuclear, or byproduct material as defined in the AEA, or the radioactive portion of mixed waste. The requirements of this Consent Order do apply, however, to the hazardous waste component of mixed waste. As stated in Section 1006 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6905, nothing in this Consent Order shall be construed to require DOE to take any action pursuant to RCRA which is inconsistent with the requirements of the AEA, as amended. In the event DOE asserts that it cannot comply with any provisions of this Consent Order under RCRA based on an alleged inconsistency between the requirements of RCRA and the AEA, as amended, it shall provide the basis for the inconsistency assertion in writing. Notwithstanding the foregoing, DOE may voluntarily include in any plan, report or other document submitted pursuant to this Consent Order, including work plans, references to, or information concerning, radionuclides or the radioactive portion of mixed waste. The voluntary inclusion of such radionuclide information by DOE in any plan, report or other document shall not be enforceable by any entity, including the State, under this

Consent Order, because such information falls wholly outside the requirements of this Consent Order.

## **II. PURPOSE AND SCOPE OF CONSENT ORDER**

A. This Consent Order supersedes the 2005 Compliance Order on Consent (2005 Consent Order) and settles any outstanding alleged violations under the 2005 Consent Order.

B. The general purposes of this Consent Order are to:

- 1) provide a framework for current and future actions to implement regulatory requirements;
- 2) establish an effective structure for accomplishing work on a priority basis through cleanup campaigns with achievable milestones and targets;
- 3) drive toward cost-effective work resulting in tangible, measurable environmental clean-up;
- 4) minimize the duplication of investigative and analytical work and documentation and ensure the quality of data management;
- 5) set a structure for the establishment of additional cleanup campaigns and milestones as new information becomes available and campaigns are completed;
- 6) facilitate cooperation, exchange of information, and participation of the Parties;
- 7) provide for effective public participation; and
- 8) define and clarify its relationship to other regulatory requirements.

C. Except as provided in Section VII (Relationship to Permits), the scope of this Consent Order fulfills the requirements for: (1) corrective actions for releases of hazardous waste or hazardous waste constituents under Sections 3004(u) and (v) and 3008(h) of RCRA, 42 U.S.C. §§ 6924(u) and (v) and 6928(h), Sections 74-4-4(A)(5)(h) and (i), 74-4-4.2(B), and 74-4-10(E) of the HWA, and their implementing regulations at 40 C.F.R. Part 264, subpart F (incorporated by 20.4.1.500 NMAC); (2) corrective actions for releases of groundwater contaminants listed at 20.6.2.3103 NMAC, toxic pollutants listed at 20.6.2.7.WW NMAC, and Explosive Compounds as defined herein, pursuant to section 74-9-36(D) of the SWA; (3) groundwater monitoring, groundwater characterization and groundwater corrective action

activities, including requirements, for regulated units under Subpart F and for miscellaneous units under Subpart X of 40 C.F.R. Part 264 and 20.4.1.500 NMAC (incorporating 40 C.F.R. Part 264); and (4) additional groundwater information required in Part B permit applications under 40 C.F.R. § 270.14(c) and (d)(3) and 40 C.F.R. § 270.23(b) (incorporated by 20.4.1.900 NMAC). The Parties agree that this Consent Order encompasses all scope included within the 2005 Consent Order, including that which has already been completed and that which has been identified subsequent to the effective date of the 2005 Consent Order.

**D. Principles Governing Execution of the Scope/Furtherance of the Purpose:**

- 1) To fulfill the above requirements, this Consent Order sets forth a process for characterizing the nature and extent of Contaminant releases, characterizing the risks to human health and the environment resulting from these releases, and mitigating unacceptable risks. This process includes the planning and implementation of corrective actions and the reporting of results.
- 2) The corrective action process reflected in this Consent Order replaces the process in the 2005 Consent Order using the following guiding principles:
  - a) Establishing an action-oriented approach to achieve mutually-agreed upon results that makes optimum use of available resources.
  - b) Performing work in a cost-effective and efficient way that provides full protection of human health and the environment.
  - c) Taking advantage of lessons learned both from previous work performed at the Facility and nationally.
  - d) Cooperatively engaging in effective planning of activities.
  - e) Employing a transparent annual planning process.
  - f) Following pertinent risk-informed guidance.
  - g) Conducting collaborative regular, periodic reviews of environmental remediation and clean-up practices.
  - h) Providing flexibility to conduct voluntary corrective actions.
  - i) Reducing the frequency of data collection and reporting where prior results indicate very low or no risk.
  - j) Reducing the volume of paperwork.

- k) Clarifying commitments and/or requirements for investigation and remediation of constituents not attributable to the Facility or not attributable to a SWMU or AOC covered by this Consent Order.

**E. Exclusions from Scope:**

This Consent Order imposes no requirements on any areas of concern (AOCs) and solid waste management units (SWMUs) previously investigated by DOE and reviewed and determined by EPA or NMED to require no further investigation or other action, except as provided for in Section VII.E.

### **III. DEFINITIONS**

Unless otherwise expressly provided herein, the terms used in this Consent Order have the meanings set forth in the HWA, RCRA, and their implementing regulations.

A. “Administrative Record” means the administrative record supporting and otherwise relating to the requirements of this Consent Order, compiled as of the effective date of this Consent Order, which forms the basis for the terms of this Consent Order. The Administrative Record includes the full record relating to DOE’s current Hazardous Waste Facility Permit (permit No. NM0890010515), and those documents submitted in writing by NMED, DOE, or the public, as of the effective date of the Consent Order for inclusion in the Administrative Record. The Administrative Record is available for review at NMED’s Hazardous Waste Bureau.

B. “Area of Concern” or “AOC” means any area having a known or suspected release of hazardous waste or hazardous constituents that is not from a solid waste management unit and that the Secretary of NMED has determined may pose a current or potential threat to human health or the environment, pursuant to 20.4.1.500 NMAC (incorporating 40 CFR 270.32 (b) (2)). An area of concern may include buildings, and structures at which releases of hazardous waste or constituents were not remediated, including one-time and accidental events.

C. “Area of Contamination” means a discrete area(s) with the potential for generally dispersed contamination located adjacent to or near a SWMU or AOC which may be requested to be part of a SWMU or AOC during corrective action activities.

D. "Atomic Energy Act" or "AEA" means the Atomic Energy Act of 1954, as amended, 42 U.S.C. §§ 2011, et seq.

E. "Consent Order" or "Order" means this Compliance Order on Consent.

F. "Contaminant" means any hazardous waste listed or identified as characteristic in 40 C.F.R. Part 261 (incorporated by 20.4.1.200 NMAC); any hazardous constituent listed in 40 C.F.R. Part 261, Appendix VIII (incorporated by 20.4.1.200 NMAC) and 40 C.F.R. Part 264, Appendix IX (incorporated by 20.4.1.500 NMAC); any groundwater contaminant listed in the WQCC regulations at 20.6.2.3103 NMAC; any toxic pollutant listed in the WQCC Regulations at 20.6.2.7.WW NMAC; and Explosive Compounds as defined herein. Contaminant does not include radionuclides or the radioactive portion of mixed waste.

G. "Corrective Measures Evaluation" or "CME" means a study or report identifying, developing, and evaluating potential corrective measures alternatives for removal, containment, and/or treatment of site-related contamination and recommending a preferred alternative for remediation of such contamination. A CME performed by DOE is equivalent to a Corrective Measures Study.

H. "Corrective Measures Implementation" or "CMI" means the design, construction, operation, maintenance, and monitoring of the remedy selected following preparation of a CME and Statement of Basis.

I. "Day" means a calendar day, unless specified as a business day. "Business day" means Monday through Friday, excluding all federal and New Mexico State holidays.

J. "Deferred" or "Deferred Site" means the SWMUs and AOCs for which full investigation and/or remediation is deferred until such time as the SWMU or AOC is taken out of service or otherwise becomes accessible (e.g., firing sites and active facilities). Deferred Sites include the SWMUs and AOCs where delayed investigation, due to active Facility operations, was proposed in NMED-approved investigation work plans and reports.

K. "Designated Agency Manager" or "DAM" means the position designated by each Party to serve as that Party's representative responsible for coordinating the implementation of this Consent Order.

L. "DOE" means the United States Department of Energy, and any successor departments or agencies.

M. “EPA” means the United States Environmental Protection Agency, and any successor departments or agencies.

N. “Explosive Compounds” means the following chemicals: 2-Amino-4,6-Dinitrotoluene (2-Am-DNT); 4-Amino-2,6-Dinitrotoluene (4-Am-DNT); 2,4-Diamino-6-Nitrotoluene (2,4-DANT); 2,6-Diamino-4-Nitrotoluene (2,6-DANT); 3,5-Dinitroaniline (3,5-DNA); Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX); 2-Nitrotoluene (2-NT); 3-Nitrotoluene (3 NT); 4-Nitrotoluene (4-NT); Pentaerythritol tetranitrate (PETN); Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX or Cyclonite); Triaminotrinitrobenzene (TATB); Tris (o-cresyl) phosphate (TCP); Methyl-2,4,6-trinitrophenylnitramine (Tetryl); 2,4,6-Trinitrotoluene (TNT).

O. “Facility” means the Los Alamos National Laboratory site owned by the United States Department of Energy and located on the Pajarito Plateau in Los Alamos County in North Central New Mexico, comprised of approximately 36 square miles and located approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe.

P. “Fiscal Year” or “FY” means the federal fiscal year, which currently begins October 1<sup>st</sup> and ends September 30<sup>th</sup> each year.

Q. “Groundwater” means interstitial water which occurs in saturated earth material and which is capable of entering a well in sufficient amounts to be utilized as a water supply.

R. “HWA” means the New Mexico Hazardous Waste Act, NMSA 1978, §§ 74-4-1 to -14.

S. “Hazard Index” or “HI” means the sum of more than one Hazard Quotient for multiple Contaminants and/or multiple exposure pathways. The HI is calculated separately for chronic, subchronic, and shorter-duration exposures.

T. “Hazard Quotient” or “HQ” means the ratio of a single substance exposure level over a specified time period (e.g., subchronic) to a reference dose for that substance derived from a similar exposure period.

U. “Hazardous constituent” or “hazardous waste constituent” means any constituent identified in 40 C.F.R. Part 261, Appendix VIII (incorporated by 20.4.1.200 NMAC), and any constituent identified in 40 C.F.R. Part 264, Appendix IX (incorporated by 20.4.1.500 NMAC).

V. “Hazardous Waste” means any solid waste or combination of solid wastes which because of its quantity, concentration, or physical, chemical, or infectious characteristics meets

the description set forth in NMSA 1978, § 74-4-3(K), and is listed as a hazardous waste or exhibits a hazardous waste characteristic under 40 C.F.R. Part 261 (incorporated by 20.4.1.200 NMAC).

W. “Hazardous Waste Regulations” means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC.

X. “Interim Measures” or “IM” means actions that can be implemented to reduce or prevent migration of site-related Contaminants which have or may result in an unacceptable human or environmental receptor risk while long-term corrective action activities are evaluated and implemented.

Y. “Maximum Contaminant Level” or “MCL” means a maximum contaminant level adopted by EPA under the federal Safe Drinking Water Act, 42 U.S.C. §§ 300f to 300j-26, or by the Environmental Improvement Board under the Environmental Improvement Act, NMSA 1978, § 74-1-8(A)(2).

Z. “Milestone” means an enforceable deadline listed in Appendix B for the current FY.

AA. “Mixed Waste” means waste that contains both hazardous waste subject to the HWA and RCRA, and source, special nuclear, or byproduct material subject to the AEA.

BB. “NMED” means the New Mexico Environment Department, and any successor departments or agencies.

CC. “Parties” means collectively NMED and DOE, and the term “Party” shall refer to either of these two entities.

DD. “Permit” means the RCRA Permit issued to DOE for the Facility to operate a hazardous waste treatment and storage facility, EPA ID No. NM0890010515, as it may be modified or amended.

EE. “Presumptive Remedy” means a clear, conservative remedy alternative or preferred technologies for common categories of sites for which DOE, based upon its past experience with remediation and EPA's scientific and engineering evaluation of performance data on technology implementation, believes, and NMED concurs, there will be no need to prepare a CME pursuant to Section XVI. For the purposes of this Consent Order, the most bounding alternative is complete source removal (i.e., complete excavation and cleanup to residential soil screening levels (SSLs)).

FF. "RCRA" means the Federal Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 to 6992k, also known as the Solid Waste Disposal Act.

GG. "RCRA Facility Investigation" or RFI means the investigation(s) conducted to investigate releases or potential releases of site-related Contaminants from SMWUs and AOCs as needed to support the purposes of this Consent Order.

HH. "Respondent" means the United States Department of Energy.

II. "SWA" means the New Mexico Solid Waste Act, NMSA 1978, §§ 74-9-1 to -43.

JJ. "Solid Waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (33 U.S.C. § 1342), or source, special nuclear, or byproduct material as defined by the AEA (42 U.S.C § 2014).

KK. "Solid Waste Management Unit" or "SWMU" means any discernible unit at which solid waste has been placed at any time, and from which NMED determines there may be a risk of a release of hazardous waste or hazardous waste constituents, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the Facility at which solid wastes have been routinely and systematically released; they do not include one-time spills. *See* 61 Fed. Reg. 19431, 19442-43 (May 1, 1996).

LL. "State of New Mexico" or "State" means the State of New Mexico, including all of its departments, agencies, and instrumentalities.

MM. "Statement of Basis" means a document prepared by NMED based on a CME that describes the basis for NMED's selection of a remedy.

NN. "Surface Impoundment" means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen material (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

OO. "Target" means a non-enforceable deadline listed in Appendix B for the next two FYs (i.e., FY+1 and FY+2).

PP. "Technical Area" or "TA" means an administrative unit of area established to encompass operations at the Facility.

QQ. "Trench" means a long, narrow depression or excavation, natural or artificial, in the earth's surface.

RR. "United States" means the United States of America, including all of its departments, agencies, and instrumentalities.

SS. "WQCC" means the New Mexico Water Quality Control Commission, and any successor agencies, boards, or commissions.

TT. "Water Quality Control Commission (WQCC) Regulations" means the regulations at 20.6.2 NMAC promulgated by the New Mexico Water Quality Control Commission governing the quality of groundwater and surface water in New Mexico.

#### **IV. FINDINGS OF FACT AND CONCLUSIONS OF LAW**

A. **FINDINGS OF FACT:** For purposes of this Consent Order only, the following constitutes a summary of facts by NMED upon which this Consent Order is based.

1) **The Parties**

a) The New Mexico Environment Department is the department within the executive branch of the New Mexico State government charged with administration and enforcement of the HWA, NMSA 1978, §§ 74-4-1 to -14; the Hazardous Waste Regulations, 20.4.1 NMAC, and the SWA, NMSA 1978, §§ 74-9-1 to -43.

b) The Respondent is a department of the United States government, and is the owner and a co-operator of the Facility.

2) **The Facility**

a) The Facility, as defined in Section III.O of this Consent Order, is the Los Alamos National Laboratory (LANL) site. The Facility currently comprises approximately 36 square miles (approximately 23,000 acres) and is located on the Pajarito Plateau in Los Alamos County in

north central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. At one point during its history, the Facility comprised up to roughly 41 square miles (26,337 acres). The Facility is surrounded by the Pueblo of San Ildefonso, Los Alamos County, Bandelier National Monument, Santa Fe National Forest, and Santa Fe County.

- b) The Pajarito Plateau is dissected by nineteen major surface drainages or canyons and their tributaries. The canyons run roughly west to east or southeast. From north to south, the most prominent canyons are Pueblo Canyon, Los Alamos Canyon, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Cañon de Valle and Water Canyon, Ancho Canyon, and Chaquehui Canyon. These canyons drain into the Rio Grande, which flows along part of the eastern border of the Facility.
- c) Hydrogeologic investigations have identified four discrete hydrogeologic zones beneath the Pajarito Plateau on which the Facility is located: (1) canyon alluvial systems; (2) intermediate perched water in the volcanic rocks (Tschicoma Formation and the Tshirege Member of the Bandelier Tuff); (3) canyon-specific intermediate perched water within the Otowi Member of the Bandelier Tuff, Cerros del Rio basalt and sedimentary units of the Puye Formation; and (4) the regional aquifer.

### 3) Facility Operations

- a) The Facility began operations in 1943 when the United States Army Manhattan Engineer District was established for the development and assembly of an atomic bomb. Current and historical operations have included nuclear weapons design and testing; high explosives research, development, fabrication, and testing; chemical and material science research; electrical research and development; laser design and development; and photographic processing.
- b) The Facility has been divided into numerous Technical Areas, or “TAs.” Many former TAs have ceased operations, have been

combined with other TAs, or were cancelled before becoming operational.

- c) For administration purposes, the Respondent has further categorized some of the areas within the TAs as "Material Disposal Areas" or "MDAs." These include, for example, MDAs A, B, T, U, and V in TA-21; MDA C in TA-50; MDAs G, H, and L in TA-54.
- d) Water supply wells at the Facility, in Los Alamos County, and on San Ildefonso Pueblo property withdraw water from the regional aquifer beneath the Pajarito Plateau.

#### 4) Waste Management

- a) As a result of the Facility operations, from approximately 1943 to the present, the Respondent has generated, treated, stored, disposed of, and otherwise handled solid wastes, including hazardous wastes, hazardous waste constituents, and mixed wastes at the Facility.
- b) The Respondent has disposed of hazardous wastes, hazardous constituents and mixed waste at the Facility. In addition, certain groundwater contaminants listed at 20.6.2.3103 NMAC, certain toxic pollutants listed at 20.6.2.7.WW NMAC, and certain Explosive Compounds as defined herein, are present in the environment at the Facility. The Respondent has disposed of such wastes in septic systems, pits, surface impoundments, trenches, shafts, landfills, and waste piles at the Facility. The Respondent has also discharged industrial wastewater and other waste from outfalls into many of the canyon systems at the Facility.

#### 5) Releases of Contaminants

- a) Waste management activities at the Facility have resulted in the release of hazardous wastes, hazardous waste constituents, mixed waste, certain groundwater contaminants listed at 20.6.2.3103 NMAC, certain toxic pollutants listed at 20.6.2.7.WW NMAC, and certain Explosive Compounds as defined herein.

- b) Contaminants that have been released into, and detected in, soils and sediments at the Facility include, for example, explosives, such as RDX, HMX, TNT; volatile organic compounds and semi-volatile organic compounds; metals such as arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, molybdenum, silver, and zinc; and polychlorinated biphenyls (PCBs).
- c) Contaminants that have been released into, and detected in, groundwater beneath the Facility include, for example, explosives, such as RDX; volatile organic compounds such as trichloroethylene, dichloroethylene, and dichloroethane; metals such as molybdenum, manganese, beryllium, lead, cadmium, chromium, and mercury; perchlorate; other inorganic contaminants such as ammonia, nitrate, and fluoride; and other contaminants. Contaminants have been detected beneath the Facility in all four groundwater zones.

6) Regulatory History of the Facility

- a) On August 13, 1980, the Respondent submitted to the United States Environmental Protection Agency (EPA) a “Notification of Hazardous Waste Activity” for the Facility pursuant to Section 3010(a) of RCRA, 42 U.S.C. § 6930(a).
- b) By letter dated November 19, 1980, the Respondent submitted to EPA a Part A RCRA permit application for the Facility. The Respondent also sent a copy of the Part A application to the Environmental Improvement Division of the New Mexico Department of Health and Environment, the predecessor to the Environment Department. The application covered hazardous waste treatment, storage, and disposal activities at TA-54, and included some 129 hazardous waste streams. The Respondent has revised the Part A permit application several times since it was first submitted, including, among other things, to notify the State that the Respondent would not seek a permit for hazardous waste disposal activities at the Facility. The Respondent’s

most recent Part A permit revision was submitted to NMED in January 2016.

- c) On January 25, 1985, the State of New Mexico received from EPA authorization to implement its hazardous waste program under the HWA in lieu of the Federal program. 50 Fed. Reg. 1515 (Jan. 11, 1985). Subsequent program revision applications were approved effective on April 10, 1990, July 25, 1990, December 4, 1992, August 23, 1994, December 21, 1994, July 10, 1995, January 2, 1996, March 10, 1997, June 13, 1998, October 1, 2003 and March 1, 2009. 40 C.F.R. § 272.1601.
- d) On November 8, 1989, NMED's predecessor agency issued a Hazardous Waste Facility Permit (Permit) to the Respondent to operate a hazardous waste treatment and storage facility at the Facility pursuant to Section 74-4-4.2 of the HWA. The Permit covered hazardous waste container storage areas at TA-16, TA-50, and TA-54, hazardous waste storage and treatment tanks at TA-54, and hazardous waste incinerators at TA-16 and TA-50. Two of the four treatment tanks at TA-54 were removed in accordance with an approved closure plan in 1996. NMED approved the closure report in 1997. The remaining two tanks were removed from the site in 2002. NMED approved the closure in 2007. The Respondent closed the incinerator at TA-16 in accordance with an approved closure plan, and NMED approved the Closure Certification Report in October 2001. The Respondent closed the incinerator at TA-50 in accordance with an approved closure plan, and NMED approved the Closure Certification Report in July 1998.
- e) In the late 1980's, the Respondent identified for EPA "Potential Release Sites," including solid waste management units (SWMUs) and "areas of concern" (AOCs), where hazardous wastes, hazardous constituents, solid wastes, or mixed wastes may have been disposed. Of those sites, EPA identified over 1200 as sites to be investigated and

included on the Hazardous and Solid Waste Amendments (HSWA) portion (known as the "HSWA Module") of the Facility's RCRA permit.

- f) On March 8, 1990, EPA issued to the Respondent the HSWA portion of the Permit, effective on May 23, 1990, covering those requirements of RCRA added by the HSWA of 1984. The EPA portion of the permit required corrective action for continuing releases of hazardous waste and hazardous waste constituents at and from the Facility pursuant to Section 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v).
- g) On July 25, 1990, the State of New Mexico received from EPA authorization to expand its hazardous waste program under the HWA in lieu of the federal program, including the authority to regulate the hazardous component of mixed waste. 55 Fed. Reg. 28397 (July 11, 1990).
- h) Effective January 2, 1996, the State of New Mexico received from EPA final authorization to implement its corrective action program under the HWA. See 60 Fed. Reg. 53,708 (Oct. 17, 1995); 61 Fed. Reg. 2450 (Jan. 26, 1996).
- i) Between 1995 and 1999, the Respondent submitted a Permit renewal application to NMED for permitted and interim status storage and treatment units at the Facility. The General Part B renewal application was initially submitted in August 1996; the TA-16 application for permitted and interim status units was initially submitted in June 1995; the TA-50 permit application for permitted and interim status units was initially submitted in January 1999; the TA-54 permit application for permitted and interim status units was initially submitted in January 1999; and the TA-55 permit application for interim status units was initially submitted in June 1996. Permit applications for interim status units at TA-3, TA-14, TA-36 and TA-39 were submitted to NMED in or before May 1999.

- j) The Permit, which was originally set to expire in November 1999, was administratively extended pursuant to 20.4.1.900 NMAC (incorporating 40 C.F.R. § 270. 51). The renewed Permit became effective in December 2010.
  - k) On June 21, 2011, the Las Conchas wildfire began burning in the Santa Fe National Forest. The fire burned over 150,000 acres and threatened the Facility and the town of Los Alamos. The proximity of the fire to above-ground stored wastes in TA-54 prompted New Mexico Governor Susana Martinez to request that the Respondent prioritize removing non-cemented above-ground wastes. The Respondent agreed to realign waste management priorities.
  - l) As a result of the agreed upon realignment of priorities, the Respondent and the State of New Mexico entered into a non-binding Framework Agreement in 2012 that realigned environmental priorities.
  - m) In the course of negotiating the 2012 Framework Agreement, the Respondent acknowledged that meeting the milestones of the 2005 Consent Order was difficult, if not impossible, given past and anticipated funding shortfalls. As part of the 2012 Framework Agreement negotiations, the Parties agreed to discuss renegotiation of the 2005 Consent Order at a future date.
  - n) In 2014, the Secretary of DOE directed that DOE's Office of Environmental Management assume oversight of the cleanup at the Facility, which will result in new and/or additional contractors implementing the work required by this Consent Order on behalf of the Respondent. As a consequence of this change, the contractor currently performing the work required by the 2005 Consent Order is no longer included as a Respondent to this Consent Order.
- 7) Procedural History of Consent Order
- a) On May 2, 2002, pursuant to Sections 74-4-10.1 and 74-4-13 of the HWA, NMED issued a Determination of an Imminent and Substantial Endangerment to Health or the Environment Concerning the Los

Alamos National Laboratory (the Determination), to the Respondent and the Regents of the University of California (University), the Facility operator prior to 2006.

- b) On May 2, 2002, NMED also issued a draft order pursuant to Sections 74-4-10.1 and 74-4-13 of the HWA, called "In Re: Proceeding Under the New Mexico Hazardous Waste Act §§ 74-4-10.1 and 74-4-13" (Draft Order). The Draft Order proposed a series of investigation and corrective action activities for the Respondent and the University to complete at the Facility.
- c) NMED provided notice and an opportunity to comment on the Draft Order. The comment period extended for 90 days and ended on July 31, 2002. During the public comment period, NMED held four public meetings to provide the public with information on the draft order. NMED received comments from 38 persons, including the Respondent, on the Draft Order.
- d) On June 3, 2002, the University filed a Complaint for Declaratory and Injunctive Relief and for Review of Agency Action in the United States District Court for the District of New Mexico (No. CIV 02-637 MV/DJS) challenging the Determination. On June 3, 2003, the University and the United States each filed a Notice of Appeal with the New Mexico Court of Appeals (Ct. App. Nos. 23,172 and 23,173), challenging the Determination.
- e) On October 9, 2002, the United States, on behalf of the Respondent, filed a Complaint in the United States District Court for the District of New Mexico (No. CIV 02-1273-LH/RHS), challenging the September 9, 2002 Installation Work Plan (IWP) Work Schedule issued by NMED. The IWP Work Schedule imposed requirements similar to those contained in the Draft Order.
- f) On November 26, 2002, NMED issued to the Respondent a Final Order called "Re: Proceeding Under the New Mexico Hazardous Waste Act §§ 74-4-10.1 and 74-4-13" (Final Order). The Final Order

contained a set of investigation, monitoring, and corrective action activities and a schedule for implementation of those activities. NMED also responded, in writing, to each of the public comments it had received on the Draft Order. The Determination issued on May 2, 2002 was also withdrawn on November 26, 2002, and the findings and conclusions contained therein were incorporated into the Final Order.

- g) On December 18, 2002, the University dismissed its complaint in the United States District Court challenging the Determination because NMED had withdrawn that Determination.
- h) On December 24, 2002, the United States filed an Amended Complaint, challenging both the 2002 IWP Work Schedule and the Final Order. The United States also filed a Notice of Appeal in the New Mexico Court of Appeals (Ct. App. No. 23,693), challenging the Final Order.
- i) On December 26, 2002, the University filed a Complaint for Declaratory and Injunctive Relief and for Review of Agency Action in the United States District Court for the District of New Mexico (No. CIV 02-1631 LFG/WDS), challenging the Final Order. On December 26, 2002, the University also filed a Notice of Appeal with the New Mexico Court of Appeals (Ct. App. No. 23,698) challenging the Final Order.
- j) From December 2002 through December 2003 and from February through March 2004, the Parties engaged in settlement negotiations to resolve the issues raised by the United States' and the University's lawsuits. To facilitate the settlement discussions, the Parties agreed to stay the pending litigation during the settlement process.
- k) On April 25, 2003, NMED issued a Compliance Order HWB 03-02, alleging that the Department of Energy and the University failed to implement interim measures at the Airport Landfill, or SWMU 73-001(a), at the Facility. The Respondent answered the Compliance

Order, denying NMED's allegations. That action was also stayed during negotiations of this Consent Order.

- l) On September 1, 2004, NMED released the proposed Consent Order resulting from the settlement negotiations for public review and comment. NMED placed a public notice of the availability of the proposed Consent Order in the local news outlets, and mailed copies of the notice to all interested parties. NMED provided the public with a 30-day period to comment on the proposed Consent Order. The comment period ended on October 1, 2004. NMED received comments from 18 persons on the proposed Consent Order. NMED responded, in writing, to each of those public comments on March 1, 2005.
- m) On March 1, 2005, NMED, the Respondent, and the University, entered into the 2005 Consent Order intended to address cleanup of the Facility. In addition, as the result of those settlement negotiations and the execution of the 2005 Consent Order, NMED agreed to withdraw the Determination, the Final Order, the Airport Landfill Order, and the 2002 IWP Work Schedule, and the United States and the University agreed to dismiss their lawsuits.
- n) The 2005 Consent Order was modified on five occasions between issuance on March 1, 2005 and issuance of this Consent Order. The following draft modifications were issued for public comment prior to incorporation into the Consent Order. On March 1, 2006 and February 23, 2007, the Consent Order schedule was modified. On June 18, 2008, Section IV.A.3.g was added to address notification procedures for certain types of detections of contaminants in groundwater. A modification to address the grouping of wells for the purpose of periodic monitoring and the frequency of submittal of the General Facility Information was completed on April 20, 2012. A modification requiring the maintenance of a publicly accessible database (Section III.Z) was completed on October 26, 2012.

**B. CONCLUSIONS OF LAW:** For purposes of this Consent Order only, the following constitutes the conclusions of law by NMED upon which this Consent Order is based.

- 1) Respondent is a “person” within the meaning of Section 74-4-3(M) of the HWA, and the Hazardous Waste Regulations at 20.4.1.100 NMAC (incorporating 40 C.F.R. § 260.10), and Section 74-9-3(I) of the SWA.
- 2) Los Alamos National Laboratory is a “facility” within the meaning of the Hazardous Waste Regulations at 20.4.1.100 NMAC (incorporating 40 C.F.R. § 260.10).
- 3) Respondent is an “owner” and an “operator” of the Facility within the meaning of the Hazardous Waste Regulations at 20.4.1.100 NMAC (incorporating 40 C.F.R. § 260.10).
- 4) Respondent has engaged in the “storage,” “treatment,” and “disposal” of “hazardous waste” at the Facility, and is currently engaged in the “storage” and “treatment” of “hazardous waste” at the Facility, within the meaning of Section 74-4-3(P), (T), (E), and (K) of the HWA, and the Hazardous Waste Regulations at 20.4.1.100 NMAC (incorporating 40 C.F.R. § 260.10).
- 5) NMED has determined that hazardous wastes and hazardous waste constituents have been “release[d]” from the Facility into the environment within the meaning of Section 74-4-10(E) of the HWA.
- 6) Pursuant to Section 74-4-10(A) of the HWA, NMED has determined that the Respondent may have violated 20.4.1.900 NMAC, incorporating by reference 40 C.F.R. § 270.33, Schedule of Compliance.
- 7) Groundwater contaminants listed at 20.6.2.3103 NMAC, toxic pollutants listed at 20.6.2.7.WW NMAC, and Explosive Compounds as defined herein are regulated under the SWA through 20.9.9 NMAC.
- 8) NMED has determined that there is or has been a release of groundwater contaminants listed at 20.6.2.3103 NMAC, toxic pollutants listed at 20.6.2.7.WW NMAC, and Explosive Compounds as defined herein into the environment requiring corrective action pursuant to Section 74-9-36(D) of the SWA and 20.9.9.14 NMAC.

## **V. PARTIES**

A. The Parties to this Consent Order are NMED and DOE, as defined in Section III.CC (Definitions).

B. The terms of this Consent Order shall apply to and be binding upon NMED and DOE, their respective agents and employees, and their successors and assigns. DOE may employ contractors for implementation of the work required by this Consent Order. DOE shall require all contractors, subcontractors, laboratories and consultants retained to perform work pursuant to this Consent Order to comply with and abide by the terms of this Consent Order. DOE shall hold the contractor(s) accountable through provisions in its contract(s) for the contractor's performance (e.g., missed milestones) that results in NMED's issuance of stipulated penalties under this Consent Order.

## **VI. WORK ALREADY COMPLETED / SUBMITTED**

A. This Consent Order shall be construed to avoid duplication of work already performed or completed as determined by NMED pursuant to its current HWA authority or by EPA pursuant to its RCRA authority prior to delegation of the RCRA program to the State. Accordingly, all such work that has been completed prior to the effective date of this Consent Order, that fulfills the substantive requirements of this Consent Order, and that has been approved by NMED or EPA, in writing, shall be deemed to comply with this Consent Order.

B. With respect to work already performed and for which documentation has been submitted by DOE to NMED pursuant to the 2005 Consent Order and for which NMED has not completed action as of the effective date of this Consent Order, NMED will proceed with timely review of such documentation. Such reviews shall be conducted in accordance with Section XXIII (Preparation / Review / Comment on Documents).

## **VII. RELATIONSHIP TO PERMITS**

A. NMED has determined that all corrective action for releases of hazardous waste or hazardous constituents at the Facility, required by Sections 3004(u) and (v) and 3008(h) of

RCRA, 42 U.S.C. §§ 6924(u) and (v) and 6928(h), and Sections 74-4-4(A)(5)(h) and (i) and 74-4-4.2(B) of the HWA, shall be conducted solely under this Consent Order and not under the current or any future Hazardous Waste Facility Permit (“Permit”), with the exception of the following five items which will be addressed in the Permit and not in this Consent Order:

- 1) New releases and newly discovered releases of hazardous waste or hazardous constituents from hazardous waste management units at the Facility.
- 2) The closure and post-closure care requirements of 20.4.1.500 NMAC (incorporating 40 C.F.R. Part 264, Subpart G), as they apply to hazardous waste management units at the Facility.
- 3) Implementation of the controls, including long-term monitoring, for any SWMUs or AOCs listed in the Permit in Attachment K (Listing of SWMUs and AOCs), Table K-2 (Corrective Action Complete with Controls).
- 4) Any corrective action conducted to address releases of hazardous waste or hazardous constituents that occur or are discovered after the date on which this Consent Order terminates pursuant to Section XXXVII (Termination) of this Consent Order.
- 5) Newly created SWMUs or AOCs from non-permitted operations.

B. Consistent with Subsection A above, the requirements of this Consent Order shall not terminate upon renewal of the Permit issued to DOE. The renewed Permit, and any future modifications, renewals, or reissuance of the Permit, will not include any corrective action activities, or any other requirement that is duplicative of this Consent Order. The Parties agree that Subsection A above is consistent with the intent of the Permit and, further, that any renewed Permit shall include the five excepted items described in Subsection A above.

C. The Parties enter into this Consent Order based on their understanding that this Consent Order shall be the only enforceable instrument for corrective action relating to the Facility, except for those items listed in Subsection A.1)-5) above, which shall be subject only to the Permit. For the purposes of any enforcement action taken by the State or any third party, other than the items listed in Subsection A.1)-5) above, NMED has determined that compliance with the terms of this Consent Order constitutes compliance with the requirements for corrective action under RCRA and the HWA and their implementing regulations, including Sections 3004(u) and (v) and 3008(h) of RCRA, 42 U.S.C. §§ 6924(u) and (v) and 6928(h), 40

C.F.R. Part 264, Subpart F, Sections 74-4-4.2(B) and 74-4-4(A)(5)(h) and (i) of the HWA and section 20.4.1.500 NMAC (incorporating 40 C.F.R. Part 264, Subpart F). Upon the effective date of this Consent Order, the sole mechanism for enforcing corrective action activities relating to the Facility, except as provided in Subsection A.1)-5) above, shall be this Consent Order. The State will not take any action to enforce the corrective action requirements of the existing Permit, except as to those items listed in Subsection A above. This Consent Order is an “enforceable document” pursuant to the requirements of 40 CFR § 264.101.

D. Consistent with Sections A through C of this Section, the Parties agree that the status of SWMUs and AOCs will be tracked under this Consent Order until Termination of this Consent Order. The Permit will not be updated while this Consent Order is in effect with information about the status of SWMUs and AOCs currently listed in the Consent Order except for SWMUs and/or AOCs for which DOE has been granted a permit modification for corrective action complete status.

E. Consistent with Section XXI (Certification of Completion), NMED’s determination that corrective action is complete for a SWMU or AOC placed on either the corrective action complete with controls list or the corrective action complete without controls list will be subject to the State’s reservation of rights for new information. During the duration of this Consent Order, if NMED seeks to require additional work at any SWMU or AOC contained on either of the two lists for corrective action complete, NMED will initiate a permit modification to remove the SWMU or AOC from such list.

F. Upon Termination of this Consent Order pursuant to Section XXXVII, any SWMUs and/or AOCs where corrective action is not complete will be addressed under the Permit in accordance with the regulations at 20.4.1.900 NMAC (incorporating 40 C.F.R. § 270.42), 20.4.1.901 NMAC, and 20.4.1.902 NMAC, including, but not limited to, opportunities for public participation, including public notice and comment, administrative hearings, and judicial appeals.

G. The Parties agree that the rights, procedures and other protections set forth at 20.4.1.900 NMAC (incorporating 40 C.F.R. § 270.42), 20.4.1.901 NMAC, and 20.4.1.902 NMAC, including, but not limited to, opportunities for public participation, including public notice and comment, administrative hearings, and judicial appeals, do not apply to modification of the Consent Order itself.

H. This Consent Order shall establish no requirements for releases of Contaminants from SWMUs or AOCs to storm water runoff that:

- 1) Are permitted under DOE's National Pollutant Discharge Elimination System (NPDES) Individual Permit for storm water discharges from SWMUs and AOCs (Individual Permit) (NM0030759 or as reissued); or
- 2) Are from SWMUs or AOCs that DOE and EPA have determined did not require coverage under the Individual Permit (i.e., SWMUs and AOCs that were not exposed to storm water, did not contain significant industrial materials, and/or did not potentially impact surface water); or
- 3) Are from SWMUs or AOCs formerly permitted under the Individual Permit that were deleted from the Individual Permit.

I. For SWMUs or AOCs that are permitted under the Individual Permit, DOE may identify and implement corrective action activities pursuant to this Consent Order that address requirements of both this Consent Order and the Individual Permit. NMED's review and approval of such corrective actions shall be limited to those elements of the corrective action that specifically address requirements of this Consent Order.

## **VIII. CAMPAIGN APPROACH**

A. To carry out the purposes set forth in Section II (Purpose and Scope) above, the Parties agree to use a structure called the "campaign approach." As described more fully below, corrective action activities required by this Consent Order will be organized into campaigns, generally based upon a risk-based approach to grouping, prioritizing, and accomplishing corrective action activities at SWMUs and AOCs. A campaign may consist of one or more projects; campaigns and projects consist of one or more tasks and deliverables. Campaigns, projects, tasks, and deliverables may be subject to two types of deadlines: milestones, which are enforceable; or targets, which are not enforceable.

### **B. PROCESS FOR ESTABLISHING CAMPAIGNS**

- 1) NMED shall maintain a list of the SWMUs and AOCs subject to this Consent Order in Appendix A (Solid Waste Management Unit/Area of Concern List). The list in Appendix A shall be updated if new SWMUs and AOCs are added

through the process in Section X (Newly Discovered Releases). Appendix A shall also identify the status of corrective action activities at each SWMU and AOC, as defined in Subsection B.2 of this Section. The information in Appendix A will be updated annually during the annual planning process defined in Subsection C of this Section.

2) Appendix A shall identify the status of corrective action activities under this Consent Order for each SWMU and AOC in accordance with Subsection C. Because each SWMU or AOC may not proceed through each status category, the categories below will be used as appropriate for the status of corrective action activities:

- a) Pre-Investigation
- b) RFI or Field Work in Progress (includes Interim Measures, Accelerated Corrective Action)
- c) RFI or Field Work Reports submitted to NMED
- d) CME in Progress
- e) CME submitted to NMED
- f) CMI in Progress
- g) CMI Reports submitted to NMED
- h) Request for Certificate of Completion submitted to NMED
- i) Certificate of Completion with controls or without controls issued
- j) Deferred – Full investigation and/or remediation of the SWMU or AOC is deferred until such time as the SWMU or AOC is taken out of service or otherwise becomes accessible (e.g., firing sites and active facilities).

3) To facilitate prioritization and completion of the corrective action activities of this Consent Order, DOE shall organize corrective action activities into campaigns as described above. Each campaign may address corrective action activities for one or more SWMUs or AOCs and may be organized geographically or as needed to facilitate execution of work. The Parties intend campaigns to capture the full range of corrective action activities needed to certify completion of corrective actions in accordance with Section XXI

(Certification of Completion). However, it may be appropriate for one or more campaigns to be implemented in phases through multiple projects (e.g., interim measures). The list of SWMUs and AOCs in Appendix A shall identify the campaign(s) to which each SWMU and AOC is assigned.

- 4) Appendix B (Milestones and Targets) shall list milestones for campaigns, projects, tasks, and/or deliverables for the current fiscal year, as well as targets for the next two years (FY+1, FY+2) for campaigns, projects, tasks, and/or deliverables planned for the next two FYs, which substantially contribute to completion of the campaigns. Milestones scheduled for the current FY are enforceable and subject to Stipulated Penalties under Section XXXV (Stipulated Penalties); targets are not enforceable and not subject to stipulated penalties.
  - a) The Parties agree to identify in Appendix B between 10 and 20 milestones for each current FY and between 10 and 20 targets for each of the next two years (FY+1, FY+2).
  - b) For milestones that do not require submission of deliverables to NMED, the Parties agree to define validation mechanisms for such milestones, i.e., proof that DOE has completed such milestones, as part of the annual planning process pursuant to Subsection C below. Validation mechanisms shall include, after DOE meets the date for the milestone listed in Appendix B, written certification by NMED of milestone validation within a specified timeframe after DOE meets that date.
  - c) The Parties agree that DOE's project plans and tools will be used to identify proposed milestones and targets. These project plans and tools will also be used to evaluate changes to milestones and targets. The Parties further agree to identify and utilize a list of other submittals that are associated with the milestones listed in Appendix B and facilitate implementation of the campaigns by enabling the Parties to allocate resources. Such other submittals will not be listed as milestones or targets in Appendix B.

- 5) Campaigns shall be listed and described in Appendix C (Campaigns). The Parties agree that the ordering of campaigns in Appendix C reflects a sequence that implements corrective action activities based upon various factors, for example, risk, resources, and geography. The organization and sequence of campaigns in Appendix C are subject to change. Should changes to the organization and sequence of campaigns potentially affect the priorities of any municipality, county or pueblo that shares a common border with the Facility, as well as the Four Accord Pueblos (Cochiti Pueblo, Pueblo de San Ildefonso, Santa Clara Pueblo and Jemez Pueblo), NMED must confer with appropriate representatives of such municipalities, counties and pueblos and allow them to comment on the new proposed organization and sequence of campaigns. Comments from such municipalities, counties and pueblos shall be considered when modifying the organization and sequence of campaigns.

#### C. ANNUAL PLANNING PROCESS

- 1) The annual planning process is the process the Parties will use to update Appendix A, Appendix B, and Appendix C, as appropriate.
- 2) Prior to the end of the first quarter of each FY, DOE will provide a revision of Appendix A to NMED indicating proposed changes (e.g., redline). This revision will provide an update of the status of SWMUs and AOCs and add new SWMUs and AOCs, if appropriate, based on the previous FY's corrective action activities. NMED shall review DOE's proposed revision and, if the revision is acceptable to NMED, the revision shall be incorporated into this Consent Order as Appendix A. Should the proposed revision not be acceptable to NMED, the Parties agree that the DAMs will meet within ten (10) business days to resolve NMED's concerns.
- 3) DOE shall update the milestones and targets in Appendix B on an annual basis, accounting for such factors as, for example, actual work progress, changed conditions, and changes in anticipated funding levels. This is called the annual planning process. For purposes of the annual planning process, milestones to be listed in the current FY's Appendix B shall be based on the FY+1 targets listed in the previous FY's Appendix B.

- a) To the extent possible, DOE will provide to NMED a forecast indicating potential, proposed changes to Appendix B (e.g., redline) by the end of July of each year. In order to facilitate this initial identification of potential, proposed changes to Appendix B, DOE shall review the existing FY+1 targets in Appendix B and identify in the forecast any foreseeable impacts (e.g., new information, Congressional appropriation marks, estimates for continuing resolutions) that could affect the FY+1 targets to enable the Parties to account for those foreseeable impacts before the Parties establish milestones for the next FY. At either Party's request, the DAMs will meet to discuss the forecast.
- b) Within fifteen (15) business days of DOE's receipt of its first FY appropriation (whether this is the full appropriation or an appropriation via continuing resolution), the DAMs shall meet to discuss the appropriation and any necessary revisions to the forecast, e.g., because DOE did not receive adequate appropriations from Congress to carry out proposed milestones listed in the forecast. Within thirty (30) business days after DOE receives this appropriation, DOE will provide a revision of Appendix B to NMED indicating proposed changes (e.g., redline) to the milestones and targets for which DOE determines it has received adequate appropriations to be carried out. Within fifteen (15) business days of NMED's receipt of this revision, NMED shall review DOE's proposed revision and, if the revision is acceptable to NMED, the revision shall be incorporated into this Consent Order as Appendix B. Should the proposed revision of Appendix B not be acceptable to NMED, the Parties agree that the DAMs will meet within ten (10) business days to resolve NMED's concerns.
- c) If DOE receives an adjustment to its appropriated levels (e.g., from continuing resolution to full year appropriation) or if the Parties agree that current milestones should be revised based on consideration of

new information (e.g., sampling or monitoring results), either Party may request a meeting of the DAMs within fifteen (15) business days to discuss proposed revisions to the milestones, if any. Within fifteen (15) business days after this meeting, DOE shall submit another proposed revision of Appendix B to NMED. Within fifteen (15) business days of NMED's receipt of this revision, NMED shall review DOE's proposed revision and, if the revision is acceptable to NMED, the revision shall be incorporated into this Consent Order as Appendix B. Should the proposed revision of Appendix B not be acceptable to NMED, the Parties agree that the DAMs will meet within ten (10) business days to resolve NMED's concerns.

- d) Upon finalizing Appendix B, NMED shall post Appendix B to their website and schedule a public meeting to present any changes to the milestones and targets in Appendix B. The meeting will describe the actual work progress made the previous year, any changed conditions at the Facility that impacted the milestones and targets, changes in funding levels and any other factors that may have contributed to changes to the milestones and targets.
- 4) During each annual planning process, DOE shall also provide NMED with a date in which it estimates that all work under the Consent Order will be completed based upon the updated information in Appendices A and B.
- 5) Prior to the end of the first quarter of the FY, DOE may provide, as appropriate, a revision of Appendix C to NMED indicating proposed changes (e.g., redline) to descriptions, organization, and sequence of campaigns. NMED shall review DOE's proposed revision and, if the revision is acceptable to NMED, the revision shall be incorporated into this Order as Appendix C. Should the proposed revision of Appendix C not be acceptable to NMED, the Parties agree that the DAMs will meet within ten (10) business days to resolve NMED's concerns.

## IX. CLEANUP OBJECTIVES AND CLEANUP LEVELS

A. Corrective actions shall be conducted under this Consent Order so that contamination due to releases from SWMUs and AOCs does not result in unacceptable risk to human health and ecological receptors based on current and reasonably foreseeable land use.

B. For human health, NMED has established target risk levels of  $10^{-5}$  lifetime excess cancer risk for carcinogenic Contaminants and a hazard index (HI) of 1 for non-carcinogenic Contaminants. NMED's target risk levels for protection of human health are based on lifetime excess cancer risk levels and non-cancer hazard index levels that are consistent with the EPA's National Oil and Hazardous Substance Pollution Contingency Plan, 40 C.F.R. § 300.430(e)(2)(i)(A)(2). As stated in NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate), these target risk and hazard index levels are used to determine whether site-related contamination poses an unacceptable risk to human health and requires corrective action or whether implemented corrective actions sufficiently protect human health and the environment. In the event that NMED updates its *Risk Assessment Guidance for Site Investigations and Remediation*, the Parties will meet to discuss any changes in updated guidance that may impact corrective action activities.

C. The corrective action process employs both screening levels and cleanup levels. Screening levels are Contaminant concentrations that indicate the potential for unacceptable risk. If Contaminants are present at concentrations above screening levels, it does not necessarily indicate that cleanup is required, but it does indicate that additional risk evaluation is needed to determine the potential need for cleanup. Cleanup levels are the Contaminant concentrations that indicate when cleanup objectives are met. The need for cleanup is triggered by potential unacceptable risk and not by exceedance of screening levels. DOE shall define the use of screening levels and cleanup levels at a site through the Data Quality Objectives developed during Facility Investigation (Section XIII) and media cleanup objectives developed during Corrective Measures Evaluation (Section XVI).

D. NMED has developed soil screening levels (SSLs) based on target risk levels of  $10^{-5}$  lifetime excess cancer risk for carcinogenic Contaminants and for non-carcinogenic Contaminants a target HI of 1. These SSLs are listed in NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate). NMED's SSLs are used

to indicate the potential for site-related contamination to be present in soils at levels that could result in human health risk above NMED cleanup goals. NMED's SSLs are based on conservative exposure assumptions for several exposure scenarios (e.g., residential, industrial, and construction worker). NMED also reviews and accepts DOE's recreational SSLs. Based on reasonable and foreseeable future land use, DOE shall use NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate) to determine whether or not a site meets acceptable risk.

E. DOE may use NMED's SSLs as soil cleanup levels to demonstrate that additional corrective action is not needed. If NMED has not developed SSLs for a particular Contaminant, DOE may use SSLs for that Contaminant developed by EPA. Alternatively, instead of using SSLs as cleanup levels, DOE may calculate site-specific risk-based soil cleanup levels based on site-specific exposure parameters in accordance with NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate). NMED must approve site-specific cleanup levels proposed by DOE.

F. NMED has developed tap water screening levels for drinking water based on the target risk levels of  $10^{-5}$  lifetime excess cancer risk for carcinogenic Contaminants and non-carcinogenic HI of 1. These screening levels are listed in NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate). NMED's tap water screening levels are used to indicate the potential for site contamination present in drinking water to result in human health risk above NMED cleanup objectives. NMED's tap water screening levels shall be used as groundwater screening levels for protection of human health if groundwater is a current or reasonably foreseeable source of drinking water. If NMED has not developed tap water screening levels for a particular Contaminant, DOE may use tap water screening levels for that Contaminant developed by the EPA adjusted to  $10^{-5}$  cancer risk for carcinogens.

G. Groundwater cleanup levels shall be established in accordance with EPA's *Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action* (2004 or as updated). Consistent with EPA's Handbook, groundwater cleanup levels shall be based on the maximum beneficial use of the groundwater to ensure protection of human health. For protection of human health and the environment, groundwater cleanup levels shall be based on existing standards (e.g., drinking water standards) when they are available and when using them

is protective of current and reasonably expected exposures. Applicable standards for use as cleanup standards for protection of human health are the WQCC groundwater standards, including alternative abatement standards (20.6.2.4103 NMAC), and 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) or the New Mexico Environmental Improvement Board (20.7.10 NMAC). If both a WQCC standard and an MCL have been established for an individual substance, then the lower of the two levels will be considered the cleanup level for that substance. If no WQCC groundwater standard or MCL has been established for a Contaminant for which toxicological information is published, DOE shall use a target risk level of  $10^{-5}$  lifetime excess cancer risk for carcinogenic Contaminants and/or non-carcinogenic HI of 1 as the basis for developing a cleanup level for the Contaminant.

H. Surface water screening levels shall be used to evaluate the potential for unacceptable risk due to release of site-related Contaminants to surface waters other than from permitted discharges. Release of Contaminants from SWMUs and AOCs to storm water runoff is regulated by DOE's National Pollutant Discharge Elimination System (NPDES) Individual Permit (NM0030759) (Individual Permit). Discharge of site-related Contaminants from SWMUs and AOCs to surface waters may also be permitted under the NPDES Multi-Sector General Permit, the NPDES Construction General Permit, or DOE's NPDES Industrial and Sanitary Permit. This Consent Order shall not establish screening levels or cleanup levels for Contaminants in storm water. Applicable New Mexico Water Quality Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) shall be used as screening levels for surface water.

I. If investigation results indicate human health risk in excess of cleanup objectives due to release of site-related Contaminants to surface water, other than from permitted discharges, DOE may develop site-specific surface water cleanup levels. Cleanup levels for protection of human health for surface water shall be developed in accordance with EPA's *Risk Assessment Guidance for Superfund (RAGS), Volume I, Part A* (1989 or as updated).

J. Screening for ecological risk shall be conducted using the Facility's Ecological Screening Levels (LANL ESLs) which are included in LANL's Ecorisk Database (2015 or as updated). In the absence of LANL ESLs, DOE may use NMED's Ecological Screening Levels (NMED ESLs) included in NMED's *Risk Assessment Guidance for Site Investigations and*

*Remediation* (2015 or updates, as appropriate). If the LANL Ecorisk Database or NMED's ESLs do not contain a screening value for the receptor or Contaminant, DOE shall derive a screening level using the methodology in the Facility's *Screening Level Ecological Risk Assessment Methods* (2012 or as updated) provided toxicity information is available either online or in the peer reviewed literature. If valid toxicity information for a Contaminant is not available, DOE may evaluate potential ecological risk using ESLs for surrogate chemicals based on structural similarities or qualitatively if a surrogate with ESLs is not available. In the event that either Party updates its ecological screening levels, the Parties will meet to discuss any changes that may impact corrective action activities.

K. If investigation results indicate the need to conduct corrective actions to mitigate unacceptable ecological risk due to release of site-related Contaminants, DOE may develop site specific ecological cleanup levels. The methodology for developing ecological cleanup levels and the values generated will be provided to NMED for review and approval prior to remediation. In the event that corrective actions to mitigate unacceptable ecological risk are necessary, the Parties will meet to discuss the proposed cleanup methodology and values.

L. If attainment of the established cleanup objectives is demonstrated to be technically infeasible, DOE may perform risk-based evaluation to establish alternative cleanup objectives for specific media at individual SWMUs or AOCs. The risk-based evaluation should be conducted in accordance with NMED's Risk Assessment Guidance for Site Investigations and Remediation (2015 or updates, as appropriate). For groundwater, pursuant to 20.9.9.16 NMAC, DOE may propose to demonstrate technical infeasibility or an alternative abatement standard of a groundwater cleanup objective of the groundwater quality standards found in 20.6.2 NMAC, utilizing the applicable requirements and procedures found in 20.6.2.4103.E and 4103.F NMAC.

M. For all other instances in which DOE seeks to vary from a cleanup objective identified above, DOE shall submit a demonstration to NMED that achievement of the cleanup objective is impracticable. In making such demonstration, DOE may consider such things as technical difficulty or physical impracticability of the project, the effectiveness of proposed solutions, the cost of the project, hazards to workers or to the public, and any other basis that may support a finding of impracticability at a particular SWMU(s) and/or AOC(s). DOE may also refer to all applicable guidance concerning impracticability,

including, for example, the criteria set forth in EPA's Interim Final Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration (September 1993) and EPA's Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action (April 2004 or as updated). In addition to demonstrating the basis for their impracticability request, DOE's written submission shall propose the action to be taken by DOE if NMED approves the impracticability demonstration. Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternative clean-up goals or levels.

N. NMED will review DOE's written submission concerning impracticability and determine whether the demonstration is approvable. NMED may consider such things as technical or physical feasibility of the project, the effectiveness of proposed solutions, the cost of the project, hazards to workers or to the public, and any other basis that may support or refute a finding of impracticability at a particular SWMU(s) and/or AOC(s).

O. If NMED approves DOE's impracticability demonstration, it will notify DOE in writing, and such notice will describe the specific action to be taken by DOE.

## **X. NEWLY DISCOVERED RELEASES**

A. Newly discovered SWMUs and AOCs subject to this Consent Order shall be added to Appendix A of this Consent Order using the process described in this Section X as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope).

B. DOE shall notify NMED within 15 days upon DOE's discovery of a potential SWMU or AOC that DOE determines is subject to this Consent Order, consistent with Section VII.A (Relationship to Permits).

C. For any newly discovered potential SWMU or AOC for which DOE provides notification to NMED that such SWMU or AOC is subject to this Consent Order pursuant to Subsection B above, DOE shall develop and implement a preliminary screening plan (including sampling and investigation activities and schedule for those activities) for such newly discovered potential SWMU or AOC, and provide NMED with the results of the preliminary screening.

- 1) If the results of the preliminary screening show that hazardous constituents are found at concentrations above residential screening levels, then such newly discovered SWMU or AOC shall be added to Appendix A of this Consent Order in accordance with Section VIII (Campaign Approach), unless DOE removes the hazardous constituents to levels that would require no long-term controls. Depending on the nature of the newly discovered SWMU or AOC, it may be appropriate for DOE to update Appendices B and/or C.
- 2) If the results of the preliminary screening show that hazardous constituents are not found at levels in excess of residential screening levels, then DOE will notify NMED that no further action related to this Consent Order will be taken.
- 3) If DOE proposes that the newly discovered potential SWMU or AOC not be added to Appendix A, NMED shall review the results and determine whether or not the site should be added to Appendix A.

## **XI. DEFERRED SITES**

A. Corrective action activities set forth in this Consent Order shall be deferred for SWMUs and AOCs whose status is identified in Appendix A as “Deferred.”

B. Table IV-2 of the 2005 Consent Order identified SWMUs and AOCs located within testing hazard zones of active firing sites for which investigation activities were deferred. SWMUs and AOCs listed on Table IV-2 of the 2005 Consent Order for which deferred investigation was proposed in NMED-approved investigation work plans and reports are identified with the status “Deferred” in Appendix A of this Consent Order in accordance with Section VIII (Campaign Approach).

- 1) The testing hazard zones associated with Deferred Sites are identified on a map entitled “Los Alamos National Laboratory Firing Sites” prepared by DOE and dated October 2003. The map, as it may be revised from time to time, is incorporated herein by reference.
- 2) DOE may revise the geographic scope and location of the designated testing hazard zones if necessary to support DOE’s operations. If that occurs, or if any other changed circumstances or other information becomes available such that

the map does not accurately depict the testing hazard zones, DOE shall revise the map and submit to NMED the revised map with explanatory information, that explains and justifies the revision, within sixty (60) days after DOE finalizes its revised map. The revised version of the map shall be incorporated herein by reference and substituted for the earlier version.

- 3) While this Consent Order is in effect, the deferral of corrective action activities may continue until such time as the firing site that has been used to delineate the relevant testing hazard zone is closed, or it is inactive and DOE has determined that it is not reasonably likely to be reactivated. The decision about the use of a firing site shall be based entirely on operation of the firing range, and such decision will be solely within DOE's discretion. At such time as the firing site is closed, or it is inactive and DOE has determined it is not reasonably likely to be reactivated, if this occurs while this Consent Order is in effect, DOE shall incorporate investigation of formerly "Deferred" SWMUs and AOCs within the former testing hazard zone into campaigns according to the campaign approach process presented in Section VIII (Campaign Approach). DOE shall also update the status of formerly "Deferred" SMWUs and AOCs in Appendix A in accordance with Section VIII (Campaign Approach). DOE shall then submit to NMED for approval RFI work plan(s) for these formerly "Deferred" SWMUs and AOCs in accordance with the requirements of Section XIII (Facility Investigation).

C. Investigation work plans and investigation reports prepared and approved under the 2005 Consent Order proposed delaying investigation at some SWMUs and AOCs associated with active Facility operations that are now identified as "Deferred" in Appendix A of this Consent Order. Accordingly, all corrective action activities set forth in this Consent Order shall be deferred for all SWMUs and AOCs whose status is identified in Appendix A as "Deferred." While this Consent Order is in effect, this deferral of corrective action activities may continue until such time as the active Facility operations comprising the basis for the deferral are no longer ongoing. At such time as DOE determines that these active Facility operations cease, if this occurs while this Consent Order is still in effect, DOE shall incorporate investigation of these formerly "Deferred" SWMUs and AOCs into campaigns according to the campaign

approach process presented in Section VIII (Campaign Approach). DOE shall also update the status of these formerly “Deferred” SMWUs and AOCs in Appendix A in accordance with Section VIII (Campaign Approach). DOE shall then submit to NMED for approval RFI work plans for these formerly “Deferred” SWMUs and AOCs in accordance with the requirements of Section XIII (Facility Investigation).

D. DOE may propose partial investigation and partial remediation, if appropriate, if portions of the SWMUs and AOCs identified as “Deferred” in Appendix A become accessible. DOE shall, at its discretion, determine when a unit is accessible or partially accessible.

E. Determinations by DOE about the availability of Deferred Sites made pursuant to this Section shall not be subject to dispute resolution under Section XXV of this Consent Order.

F. Upon Termination of this Consent Order pursuant to Section XXXVII, any “Deferred” SWMUs and/or AOCs will be addressed under the Permit.

## **XII. GROUNDWATER MONITORING**

A. In accordance with the 2005 Consent Order, DOE has monitored and continues to monitor groundwater at and around the Facility, including base flow, alluvial groundwater, intermediate-perched groundwater, and regional aquifer groundwater, in accordance with NMED-approved annual updates to the Interim Facility-Wide Groundwater Monitoring Plan (IFGMP), and monitoring results have been reported in periodic monitoring reports submitted to NMED. DOE shall implement the monitoring requirements of NMED-approved IFGMP in effect on the effective date of this Consent Order and prepare and submit periodic monitoring reports required by that plan.

B. Each year, DOE shall prepare a revised IFGMP for each upcoming monitoring year (October 1 through September 30), including monitoring locations, frequencies, analytical suites, and related activities, as well as a schedule for performing monitoring activities and submitting period monitoring reports. As appropriate, proposed updates may include adding, deleting, or revising monitoring groups. The revised IFGMP shall specify collection of monitoring data that is necessary and sufficient to support corrective action activities. Analytical methods shall be capable of detecting Contaminants at or below screening levels or, with approval of NMED, other reporting levels, as appropriate. The revised IFGMP shall be

submitted to NMED by June 30 of each year for review and approval in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order by September 30 of each year.

C. DOE shall implement the approved IFGMP. DOE shall review analytical data from groundwater monitoring in accordance with the requirements of Section XXVI (Quality Assurance / Data Management / Data Review) of this Consent Order and provide the notifications required by that Section.

D. As DOE completes corrective action activities at SWMUs or AOCs, DOE may propose changes to monitoring groups to reflect near-term groundwater monitoring activities.

E. Upon completion of corrective action activities at a SWMU or AOC or for contaminated groundwater and the requisite monitoring period, DOE may include long-term groundwater monitoring requirements in a permit modification request. DOE will then remove groundwater monitoring requirements for that SWMU or AOC from the next revision of the IFGMP.

F. Upon Termination of this Consent Order, any groundwater monitoring requirements remaining in the most recent NMED-approved IFGMP shall be implemented through the Facility's Hazardous Waste Permit. Upon Termination of this Consent Order, DOE shall include groundwater monitoring requirements in a permit modification request made pursuant to Section VII (Relationship to Permits).

### **XIII. FACILITY INVESTIGATION**

A. RCRA Facility Investigations (RFI/s) shall be conducted, where necessary, to investigate releases or potential releases of site-related Contaminants from SMWUs and AOCs or releases of legacy Contaminants to groundwater as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope). Consistent with the U.S. Environmental Protection Agency's (EPA's) *Results-Based Approaches and Tailored Oversight Guidance* (2003), investigation efforts shall be focused on the overall goal to accomplish environmental cleanup and reduce risk. To support this goal, investigation planning shall include early identification of SWMUs and AOCs not posing an unacceptable risk to human health and the environment, as well as early identification of potential remedies for those

SWMUs and AOCs that potentially do pose a risk based upon current and reasonably foreseeable future land use. RFIs shall focus on collection of those data necessary and sufficient to support decisions on corrective action activities, and RFIs shall follow EPA's Data Quality Objectives (DQO) process, set forth in EPA's Guidance on Systematic Planning Using the Data Quality Objectives Process (February 2006 or as updated). DOE shall provide notification to NMED of corrective action field activities a minimum of 15 days prior to commencing the activity.

B. The Parties agree that the term "investigation" was used under the 2005 Consent Order to mean RFI and may continue to be used in this way (e.g., investigation work plans and reports are equivalent to RFI work plans and reports).

C. Each RFI shall be performed pursuant to an RFI work plan approved by NMED in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order. Each RFI work plan shall detail the objectives, approach, estimated schedule and work scope of the proposed investigation. Each RFI work plan shall also include a provision that allows DOE to perform extra work (e.g., step out sampling to determine nature and extent of contamination) based on data obtained during implementation of the RFI work plan, without further approval from NMED.

D. If, during investigation, DOE determines that changes to approach or work scope detailed in the work plan are needed to meet the investigation objectives, DOE shall notify NMED in writing. If changes to approach or work scope detailed in the work plan needed to complete the investigation would cause DOE to miss a milestone, e.g., for submittal of an RFI report, in the current FY, DOE shall request an extension in accordance with Section XXVIII (Extensions).

E. For those SMWUs and AOCs addressed in investigation work plans prepared and approved by NMED under the 2005 Consent Order but not yet implemented, DOE may perform the RFIs in accordance with those investigation work plans, or in accordance with an RFI work plan prepared under this Section.

F. Following completion of all or portions of the work scope specified in the approved RFI work plan, DOE shall review the investigation results to determine whether the objectives of the investigation have been met.

G. DOE shall document the results of investigations performed in RFI reports. RFI reports shall identify the corrective action activities for the SWMU(s) and/or AOC(s) that is/are the subject of the RFI and whether performance of a CME is necessary and appropriate. RFI reports shall be submitted to NMED for review and approval in accordance with Section XXIII (Preparation / Review / Comments on Documents).

H. During preparation of the RFI report, DOE shall evaluate investigation results to determine whether to take interim measures in accordance with Section XV (Interim Measures/Emergency Interim Measures).

I. As appropriate, NMED's approval of RFI Report(s) may provide explicit validation for whether corrective action activities are complete at particular SWMU(s) or AOC(s), including validation of recommended controls, as appropriate.

J. Consistent with Section XXIII (Preparation / Review / Comments on Documents), the Parties agree to confer, and meet as appropriate, on the technical approach and/or results to be presented in RFI work plans and reports.

#### **XIV. AREAS OF CONTAMINATION**

A. Using the procedure in Subsection B and in accordance with EPA's Area of Contamination Policy and Memorandum (March 25, 1996), DOE may propose to designate portions of land with SWMUs and/or AOCs that are currently undergoing corrective action, into a single Area of Contamination. Consolidation or in situ treatment of wastes within the Area of Contamination will not trigger RCRA requirements such as land disposal restrictions or minimum technology requirements.

B. Should DOE choose to request an Area of Contamination designation, DOE shall request, in writing, NMED's approval of an Area of Contamination determination in advance of implementation of any work within the Area of Contamination. The request must include: 1) a description of the activities to be conducted within the Area of Contamination; 2) a map depicting the boundary of the Area of Contamination; and 3) a description of additional confirmatory sampling to be performed if the area within the Area of Contamination, but outside the original SWMU/AOC boundary, becomes contaminated.

C. NMED shall review the Area of Contamination determination request and provide a written response to DOE in which it approves, disapproves, or requests additional information.

## **XV. INTERIM MEASURES/EMERGENCY INTERIM MEASURES**

A. Interim measures may be used as appropriate to reduce or prevent migration of site-related Contaminants which have or may result in an unacceptable human or environmental receptor risk while long-term corrective action remedies are evaluated and implemented. NMED and DOE may identify the need for interim measures during development or review of RFI work plans and reports, during performance of RFIs, or through review of new information related to potential releases of Contaminants from SWMU(s) or AOC(s).

B. If NMED identifies the need for interim measures, NMED shall notify DOE in writing. Alternatively, if DOE identifies the need for interim measures, DOE shall notify NMED in writing. The written notifications shall identify the SWMU(s) or AOC(s) where NMED or DOE, as applicable, identifies the need for interim measures and the objectives of such interim measures, including the specific Contaminants, media, and receptors to be addressed. Upon receipt of such notifications, the DAMs shall meet to discuss the need for interim measures, the scope of the interim measures, and a schedule for submitting an Interim Measures Work Plan.

C. DOE shall prepare an Interim Measures Work Plan, which shall include estimated implementation schedules for completion of the interim measures, and submit to NMED for review and approval in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order.

D. Following completion of interim measures, DOE shall submit to NMED an Interim Measures Report. The Interim Measures Report shall summarize the results of the interim measures and include the results of all field screening, monitoring, sampling, analysis, and other data generated as part of the interim measures implementation. NMED will review and approve the Interim Measures Report in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order.

E. DOE may determine, during implementation of corrective action activities at SWMU(s) and/or AOC(s), that emergency interim measures are necessary to address an

immediate threat of harm to human health or the environment. DOE shall notify NMED, by phone and in writing, within three business days of discovery of the facts giving rise to the immediate threat, and shall propose emergency interim measures to address the immediate threat. NMED will respond in writing to such proposal within three business days of receipt of the proposal. If NMED approves the emergency interim measures, DOE may implement the proposed emergency interim measures without submitting an Interim Measures Work Plan. If circumstances arise resulting in an immediate threat to human health or the environment such that initiation of emergency interim measures are necessary prior to obtaining written approval from NMED, DOE shall notify NMED within one business day of taking the emergency interim measure. The notification, which can be made by email, shall contain a description of the emergency situation, the types and quantities of Contaminants involved, the emergency interim measures taken, and contact information for the emergency coordinator who handled the situation. The notification shall also include a written statement (email is acceptable) justifying the need to take the emergency action without prior written approval from NMED. Upon completion of emergency interim measures, an Interim Measures Report shall be prepared by DOE and submitted to NMED for review and approval in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order. This Interim Measures Report shall be submitted within 90 days of completing the emergency interim measures or by an alternative date agreed to by the DAMs.

F. If implementation of an Emergency Interim Measure will impact DOE's compliance with milestones listed in the current FY's Appendix B, DOE may implement the Emergency Interim Measure without first revising Appendix B. NMED and DOE shall meet as soon as practicable after implementation of the Emergency Interim Measure to revise Appendix B to incorporate the Emergency Interim Measure and adjust or remove any milestone in the current FY's Appendix B that has been impacted by implementation of the Emergency Interim Measure.

## **XVI. CORRECTIVE MEASURES EVALUATION**

A. Corrective Measures Evaluations (CME/s) shall be conducted as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope). DOE shall perform a CME when, based on the relevant RFI report, NMED notifies DOE that a CME is required. The Parties agree that a Corrective Measures Evaluation (CME/s) performed by DOE is equivalent to a Corrective Measures Study (CMS/s).

B. CMEs will be performed to identify, develop, and evaluate potential corrective measures alternatives for removal, containment, and/or treatment of site-related contamination. CME(s) will focus on remedies based on consideration of site conditions and the extent, nature, and complexity of releases and contamination. DOE shall use a graded approach, i.e., evaluate alternatives using the criteria in the Subsection below, in identifying corrective measures alternatives. Based on application of the criteria in the Subsection below, a CME may detail why some alternatives are excluded from further evaluation in the CME.

C. DOE shall conduct CME(s) that include evaluation of corrective measures alternatives using the following threshold and balancing criteria. Any corrective measure alternative proposed in the CME Report must meet the threshold criteria, which are evaluation standards derived from EPA's RCRA Corrective Action Plan, OSWER Directive 9902.3-2A (May 1994). DOE shall use the balancing criteria, which are other factors derived from that guidance, to evaluate alternatives meeting the threshold criteria.

### **1) Threshold Criteria**

- a) Be protective of human health and the environment.
- b) Attain media cleanup objectives.
- c) Control the source(s) of releases.
- d) Comply with applicable standards for management of wastes.

### **2) Balancing Criteria**

- a) Long-term reliability and effectiveness (including sustainability, long-term stewardship considerations, and long-term environmental impacts).
- b) Reduction of toxicity, mobility or volume of waste and contaminated media.

- c) Short-term effectiveness (including near-term environmental impacts).
- d) Implementability.
- e) Cost.

D. The balancing criteria shall be evaluated in accordance with the following:

- 1) Long-term Reliability and Effectiveness: The remedy shall be evaluated for long-term reliability and effectiveness, including the consideration of the magnitude of risks that will remain after implementation of the remedy; the extent of long-term monitoring, or other management that will be required after implementation of the remedy; the uncertainties associated with leaving contaminants in place; DOE's long-term stewardship of the site, environmental impacts; sustainability; and the potential for failure of the remedy. Other criteria being equal, DOE shall give preference to a remedy that reduces risks with minimal long-term management, and that has proven effective under similar conditions.
- 2) Reduction of Toxicity, Mobility or Volume: The remedy shall be evaluated for its reduction in the toxicity, mobility, and volume of contaminants. Other criteria being equal, DOE shall give preference to a remedy that uses treatment to more completely and permanently reduce the toxicity, mobility, and volume of contaminants.
- 3) Short-Term Effectiveness: The remedy shall be evaluated for its short-term effectiveness, including the consideration of the short-term reduction in existing risks that the remedy would achieve; the time needed to achieve that reduction; the near-term environmental impacts; and the short-term risks that might be posed to the community, workers, and the environment during implementation of the remedy. Other criteria being equal, DOE shall give preference to a remedy that quickly reduces short-term risks as well as near-term environmental impacts, without creating significant additional risks.
- 4) Implementability: The remedy shall be evaluated for its implementability or the difficulty of implementing the remedy, including the consideration of installation and construction difficulties; operation and maintenance difficulties; difficulties with cleanup technology; permitting and approvals; and the availability of necessary equipment, services, expertise, and storage and disposal capacity. Other

criteria being equal, DOE shall give preference to a remedy that can be implemented quickly and easily, and poses fewer and lesser difficulties.

- 5) **Cost:** The remedy shall be evaluated for its cost, including a consideration of both capital costs, and operation and maintenance costs. Capital costs shall include, without limitation, construction and installation costs; equipment costs; land development costs; and indirect costs including engineering costs, legal fees, permitting fees, startup and shakedown costs, and contingency allowances. Operation and maintenance costs shall include, without limitation, operating labor and materials costs; maintenance labor and materials costs; replacement costs; utilities; monitoring and reporting costs; administrative costs; indirect costs; and contingency allowances. All costs shall be calculated based on their net present value. Other criteria being equal, DOE shall give preference to a remedy that is less costly, but does not sacrifice protection of human health and the environment.

E. DOE shall document the results of a CME and recommend a preferred alternative for remediation in a CME Report. CME Reports shall be submitted to NMED, and NMED shall review and issue a Statement of Basis in accordance with Section XVII (Statement of Basis/Selection of Remedies) of this Consent Order.

F. The Parties agree that CMEs performed under the 2005 Consent Order may be used to satisfy the requirements of this Section.

G. Consistent with Section XXIII (Preparation / Review / Comments on Documents), the Parties agree to confer, and meet as appropriate, on the content of CMEs.

## **XVII. STATEMENT OF BASIS / SELECTION OF REMEDIES**

A. Statements of Basis shall be prepared, and remedies selected, as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope). NMED shall be responsible for preparation of the Statement of Basis and selection of a remedy for which a CME Report is prepared by DOE in accordance with Section XVI (Corrective Measures Evaluation) of this Consent Order. NMED shall select the remedy based on the information presented in the relevant CME Report, data from previous RFI Reports, and information provided during the public comment period and/or during the public hearing

process, as applicable consistent with the regulations at 20.4.1.900 NMAC (incorporating 40 C.F.R. § 270.42), 20.4.1.901 NMAC, and 20.4.1.902 NMAC. The remedy that NMED selects must meet the threshold criteria set forth in Section XVI.C.1), and NMED must consider Section XVI.C.2)'s balancing criteria, as analyzed by DOE in the relevant CME Report, as part of its remedy selection. NMED may choose, consistent with EPA's RCRA Corrective Action Plan, OSWER Directive 9902.3-2A (May 1994), a different remedy from that recommended by DOE in the CME Report.

B. NMED's Statement of Basis shall describe the basis for NMED's selection of a remedy. 20.1.4 NMAC NMED shall issue the Statement of Basis for public comment, and it shall be sufficiently detailed for the public and DOE to understand and comment on NMED's recommended decision on the remedy, and the studies and conclusions leading up to the decision on the remedy. The public comment period will extend for at least sixty (60) days from the date of the public notice of the Statement of Basis. NMED will provide an opportunity for a public hearing on the remedy, at which all interested persons will be given a reasonable chance to submit data, views or arguments orally or in writing and to examine witnesses testifying at the hearing. The comment period will automatically be extended to the close of the public hearing. The public hearing will follow the hearing requirements under section 20.4.1.901.F NMAC. NMED will select a final remedy and issue a response to public comments to all commenters within ninety (90) days, or other appropriate time, after the end of the public comment period. In selecting a remedy, NMED will follow the public participation requirements applicable to remedy selection under sections 20.4.1.900 NMAC incorporating 40 C.F.R. § 270.41, 20.4.1.901 NMAC, 20.4.1.902 NMAC, and 20.1.4 NMAC.

C. NMED's decision selecting the remedy shall follow the requirements under section 20.4.1.901.G NMAC, Secretary's Decision.

## **XVIII. CORRECTIVE MEASURES IMPLEMENTATION**

A. Corrective measures, i.e., remedies selected in accordance with Section XVII (Statement of Basis/Selection of Remedies), shall be implemented as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope). Corrective Measures Implementation (CMI) means the design, construction, operation, maintenance, and

monitoring of the remedy selected following preparation of a CME pursuant to Section XVI and Statement of Basis pursuant to Section XVII. DOE agrees to prepare CMI Plan(s), implement corrective measures, and prepare CMI Report(s).

B. Each CMI Plan shall include plans for the design, construction, operation, maintenance, and monitoring for the remedy selected by NMED under Section XVII (Statement of Basis/Selection of Remedy). Each CMI Plan shall be prepared and submitted to NMED for review and approval in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order.

C. Each CMI Report shall document implementation and completion of the remedy in accordance with its NMED-approved CMI Plan. Each CMI Report shall include a recommendation of “Certificate of Completion with controls” or “Certificate of Completion without controls” for corrective action activities completed under this Consent Order. CMI Reports shall be prepared and submitted to NMED for review and approval in accordance with Section XXIII (Preparation / Review / Comment on Documents) of this Consent Order.

D. NMED’s approval of CMI Report(s) shall provide explicit validation for whether corrective action activities are complete at particular SWMU(s) or AOC(s), including validation of recommended controls, as appropriate.

## **XIX. ACCELERATED CORRECTIVE ACTION AND PRESUMPTIVE REMEDIES**

A. The Parties agree that flexibility in implementing corrective actions is needed to most efficiently achieve the purposes of this Consent Order described in Section II (Purpose and Scope). Accelerated corrective action activities may be implemented to address risks to human health and/or the environment, reduce corrective action costs, and/or achieve cleanup ahead of deadlines otherwise proposed, e.g., Appendix B. Such accelerated activities are distinct from Emergency Interim Measures, as described in Section XV (Interim Measures/Emergency Interim Measures) and shall not be subject to milestones or associated with targets in the current FY’s Appendix B, pursuant to Section VIII (Campaign Approach). The Parties agree that DOE may implement accelerated corrective actions (1) involving contaminated groundwater or (2) taking longer than 180 days, notwithstanding the provisions of 20.4.2.7.A and B NMAC.

B. If an NMED-approved work plan already addresses corrective action activities that DOE endeavors to accelerate, DOE may accelerate such corrective action activities included within such NMED-approved work plan without prior written approval from NMED, provided that such accelerated activities shall not detract from milestones in the current FY's Appendix B and that DOE shall notify NMED of such field activities associated with accelerated corrective action.

C. If an NMED-approved work plan does not address corrective action activities that DOE endeavors to accelerate, DOE may develop and submit work plan(s), and subsequently accelerate corrective action activities that are addressed by such work plan(s) without prior written approval from NMED, provided that such accelerated activities do not detract from milestones in the current FY's Appendix B and that DOE shall notify NMED of such field activities associated with accelerated corrective action.

D. Upon completion of any accelerated activities pursuant to Subsections B and C, DOE shall provide report(s) that document(s) the results of the accelerated activities, as appropriate, and NMED shall review such report(s) pursuant to Section XXIII (Preparation / Review / Comment on Documents).

E. Presumptive Remedies. The Parties agree that implementation of presumptive remedies is appropriate and desirable for SWMUs and AOCs for which DOE determines that there is a clear, conservative remedy for which DOE believes that there will be no need to prepare a CME under Section XVI. DOE's determination will be based upon its past experience with remediation and with NMED.

- 1) If DOE determines that the scope of the presumptive remedy is the most bounding alternative that would otherwise be evaluated under a CME, DOE will prepare a Remedy Implementation Plan and submit to NMED for approval consistent with Section XXIII (Preparation / Review / Comment on Documents). Upon approval, DOE will implement the Remedy Implementation Plan. The results of the implementation will be documented in a Remedy Completion Report, which DOE will submit to NMED for approval consistent with Section XXIII (Preparation / Review / Comment on Documents).
- 2) If DOE determines that the scope of the presumptive remedy is limited enough to accomplish during the RFI (e.g., removal of small volumes of soil

contaminated above soil screening levels), DOE may accelerate corrective action activities by performing the presumptive remedy during the RFI without prior notification to NMED or NMED approval. If so, DOE shall report the results of such presumptive remedy either in the relevant RFI Report pursuant to Section XIII (Facility Investigation) or in a Remedy Completion Report, which DOE will submit to NMED for approval consistent with Section XXIII (Preparation / Review / Comment on Documents).

- 3) NMED's approval of Remedy Completion Report(s) shall provide explicit validation for whether corrective action activities are complete at particular SWMU(s) or AOC(s), including validation of recommended controls, as appropriate.

## **XX. AT RISK WORK**

The Parties agree that DOE may perform any of the corrective action activities required by this Consent Order at risk and in advance of NMED approval. Should DOE fail to meet the objectives and/or requirements of the at-risk corrective action(s), NMED may require DOE to conduct additional work to satisfy the requirements of this Consent Order.

## **XXI. CERTIFICATION OF COMPLETION OF CORRECTIVE ACTION**

A. Certificates of Completion shall be issued, as appropriate to support the purposes of this Consent Order described in Section II (Purpose and Scope). DOE shall request Certificates of Completion for SWMUs and AOCs subject to the requirements of this Consent Order. DOE commits to timely submission of Certificate of Completion requests upon receipt of NMED's approval of completion reports, and NMED commits to a timely review of DOE's requests for Certificates of Completion. A Certificate of Completion is intended to document completion of corrective action activities and assign controls, if necessary, at sites covered by this Consent Order and in accordance with Section VII.

B. NMED shall review the request(s). If NMED concurs that the corrective action activities are complete, NMED shall issue Certificate(s) of Completion. If NMED does not

concur that corrective action activities are complete for the SWMU(s) or AOC(s), as applicable, NMED shall disapprove the request for Certificate of Completion and provide the basis for the disapproval in writing.

C. DOE may request Certificate(s) of Completion with or without controls, as appropriate, based on NMED's approval of relevant reports prior to the effective date of this Consent Order.

D. DOE may request, and NMED may grant, Certificate(s) of Completion without Controls for SWMUs and AOCs for which institutional or physical controls are not needed to meet cleanup objectives identified in accordance with Section IX (Cleanup Objectives and Cleanup Levels), and for which operation, maintenance, and/or monitoring will not be required after completion of corrective actions. Except as provided in Subsections G, H, and I, SWMUs and AOCs meeting cleanup objectives for human health under the residential scenario and posing no unacceptable risk to ecological receptors shall be eligible for Certificate(s) of Completion without Controls.

E. DOE may request, and NMED may grant, Certificate(s) of Completion with Controls for SWMUs and AOCs for which institutional and/or physical controls are needed to meet cleanup objectives identified in accordance with Section IX (Cleanup Objectives and Cleanup Levels), and/or for which operation, maintenance, and/or monitoring will be required after completion of corrective actions. For such SWMUs and AOCs, DOE shall propose appropriate controls in their request for Certificate(s) of Completion, and NMED shall specify such controls upon issuance of the Certificate(s) of Completion. Controls shall be limited to actions necessary to meet cleanup objectives identified in accordance with Section IX (Cleanup Objectives and Cleanup Levels), as related to releases of site-related Contaminants from SWMUs and AOCs.

F. DOE may request, and NMED may grant, modification or removal of institutional and/or physical controls required by previously granted Certificate(s) of Completion based on new information, including information that demonstrates that institutional and/or physical controls are no longer needed to meet cleanup objectives.

G. Should NMED determine that specific Contaminants are not attributable to the Facility (e.g., Contaminants from anthropogenic sources) or not attributable to a SWMU or AOC covered by this Consent Order but are included in the risk assessment and the SWMU or

AOC exceeds a residential risk solely due to the presence of these Contaminant(s), DOE may request a certificate of completion without controls. DOE's request must include the following items:

- 1) The request must indicate those Contaminants for which an acceptable risk level under a residential risk scenario was reached during corrective action activities at the site;
- 2) The request must indicate those Contaminants for which an acceptable risk level under a residential risk scenario was not reached through corrective action activities at the site;
- 3) The request must indicate how DOE will notify the current property owner (if property not owned by DOE) of the certificate of completion without controls, including any contaminant(s) identified in number 2 above at the site. NMED must be provided a copy of this notification.

H. After receipt of the certificate of completion without controls request pursuant to Subsection G, NMED will review the request and either request additional information, deny the request or issue a certificate of completion without controls. NMED's certificate of completion will list the Contaminants that pose an acceptable risk under a residential risk scenario as well as the Contaminants that pose an unacceptable risk under a residential risk scenario addressed as part of corrective action activities at the SWMU or AOC.

I. When applicable, DOE will comply with the terms of 40 CFR § 266.202 with respect to identifying the presence of military munitions and whether such military munitions are a solid waste. Where DOE is conducting corrective action activities for those SWMUs and AOCs where munitions were formerly detonated, DOE will submit requests for certificates of completion that demonstrate how the requirements of 40 CFR § 266.202 have been met and will identify proposed controls, if any, and appropriate time frames for such controls. At either Party's request, the DAMs will meet to discuss proposed controls to resolve NMED's concerns, thus facilitating the timely issuance of certificates of completion for these SWMUs and AOCs. At a minimum, DOE will commit to maintaining records on the former use of the property as a range.

J. Pursuant to the SWA, NMED reserves any right it may have to impose long-term monitoring or other activities relating to certain Contaminants that are not hazardous wastes or

hazardous constituents as part of issuance of a certificate of completion under this Consent Order.

K. If either of the following occur, NMED shall notify DOE of its intent to re-evaluate and potentially withdraw a certificate of completion:

- 1) Conditions unknown to NMED at the time of issuance of a certificate of completion, which are discovered following issuance of the certificate of completion, where the previously unknown conditions together with other relevant information indicate that a particular certificate of completion is not protective of human health or the environment; or
- 2) Information unknown to NMED at the time of issuance of a certificate of completion, which is discovered following issuance of the certificate of completion, where the new information together with other relevant information indicate that a particular certificate of completion is not protective of human health or the environment.

## **XXII. DESIGNATED AGENCY MANAGERS**

A. No later than 20 days after the effective date of this Consent Order, NMED and DOE shall each designate which position within their respective organizations shall serve as the Designated Agency Manager (DAM) responsible for coordinating the implementation of this Consent Order. Each Party shall notify the other in writing of the position designated, including any changes made thereto. By mutual agreement, the Parties may designate a different position within their organizations to serve as the DAM, provided that the position has sufficient authority to make decisions on behalf of the organization.

B. To the maximum extent possible, communications between NMED and DOE and all documents, including reports, agreements, and other correspondence, concerning the activities performed pursuant to the terms and conditions of this Consent Order, shall be directed through the DAMs. Except as otherwise indicated in Subsections C and D, nothing in this section shall limit each DAM's ability to delegate authority, as appropriate, within their respective organizations, including signatory authority. Each DAM shall be responsible for

ensuring the internal dissemination and processing of all communications and documents received from the other DAM.

C. The DAMs shall meet regularly and as needed, but no less than quarterly, to review and discuss the progress of work being performed under this Consent Order and any related issues or concerns. This obligation to meet may not be delegated below the position.

D. The DAMs shall participate in the annual planning process, including mid-year adjustments to Appendix B, and any other matter prior to its elevation to dispute resolution pursuant to Section XXV (Dispute Resolution). These obligations may not be delegated below the position.

### **XXIII.PREPARATION / REVIEW / COMMENT ON DOCUMENTS**

A. To support the purposes of this Consent Order described in Section II (Purpose), the Parties agree to work collaboratively to resolve issues arising during preparation and review of documents and to facilitate the efficient approval of documents.

B. Any documents previously submitted and disapproved under the 2005 Consent Order, but not yet resubmitted by the effective date of this Consent Order, may be developed and submitted in accord with the procedures and requirements of this Consent Order.

C. Pre-submission Review. Prior to DOE's preparation of any work plan or report required by Sections XIII, XVI, XVIII, XIX, or XV (Facility Investigation, Corrective Measures Evaluation, Corrective Measures Implementation, Accelerated Corrective Action, Interim Measures), the Parties agree to confer, and meet as appropriate, on the content, technical approach, and/or results to be presented in the documents in an effort to reach a common understanding, called the pre-submission review. During this pre-submission review, NMED will attempt to identify issues or concerns with the technical approach and/or results that would preclude NMED's approval.

D. Schedules for NMED's Review. Prior to DOE's submission of any work plan or report required by Sections XIII, XVI, XVIII, XIX, or XV (Facility Investigation, Corrective Measures Evaluation, Corrective Measures Implementation, Accelerated Corrective Action, Interim Measures), the Parties agree to reach agreement on review schedules by when NMED will review and approve or disapprove DOE's submission(s). Appendix D provides target

review schedules for those submissions; however, agreed-upon review schedules will be based on the size (e.g., multiple volumes) and quality of the submission(s). NMED may request a single extension for a specified number of days to an agreed-upon review schedule. Such extension to the review schedule will be agreed upon by the DAMs. If NMED action on a DOE submission is not completed in accordance with an agreed-upon review schedule, the submittal will be deemed approved.

E. **Informal Review/Comment Resolution Process.** Prior to NMED's approval with modifications or disapproval of DOE's submission(s), the Parties agree to attempt to resolve NMED's concerns and comments informally to the extent possible. To accomplish this goal, the Parties shall meet to informally review, discuss, and, if possible, resolve, NMED's proposed concerns and comments.

- 1) During this informal comment resolution process, NMED may request that DOE provide supplemental information needed to aid NMED's review and DOE will use its best efforts to provide such information. Such supplemental information may also be voluntarily submitted by DOE to NMED.
- 2) During this informal comment resolution process, NMED agrees to share with DOE information regarding its anticipated approval with modifications or disapproval.

F. Following the informal comment resolution meeting, and upon review and consideration of any supplemental information provided by DOE, NMED shall submit to DOE a formal, written response to DOE's submission(s) that shall be limited to: approve the document as submitted; approve the document with modifications; or, disapprove the document.

- 1) If NMED approves the document as submitted, no additional revisions or modifications to the document shall be needed.
- 2) If NMED approves the document with modifications, NMED's notification shall clarify whether DOE needs to resubmit a revised document and specify a time frame for DOE's response. The Parties agree that, whenever possible, NMED shall limit the need for DOE to resubmit the document; the Parties further agree that NMED's approval of a document with modifications is intended to address the situation where modification can be accommodated by limited page changes without a complete revision of the document. Except in

cases where DOE objects to the modifications, if DOE's document need not be revised, DOE will incorporate the modifications into corrective action activities. Where NMED approval with modifications entails additional work, the Parties agree to discuss NMED's proposed additional work during the informal comment resolution process in Subsection E and follow the process set forth in Subsections J and K.

- 3) If NMED disapproves the document, NMED shall provide written comments that identify the reasons for the disapproval ("disapproval comments") and specify a time frame for DOE's response. NMED's disapproval comments shall be limited to addressing the information presented in the document being reviewed and requirements applicable to that document, and shall not apply to other documents. NMED comments intended to impact future document submissions shall be addressed pursuant to Subsection I.

G. Disapproval. If NMED disapproves the document, after NMED provides disapproval comments, a meeting to discuss the disapproval comments and to resolve these comments shall be held if requested by DOE's DAM. This meeting shall be attended by both DAMs, NMED's reviewer(s) of the document, and technical staff familiar with the document.

- 1) Before this meeting, DOE may prepare and provide to NMED, a draft written response (e.g., response letter, comment response document, or change table) to each of NMED's disapproval comments. DOE's draft responses shall either indicate concurrence with NMED's comment or indicate nonconcurrence and provide an explanation for nonconcurrence. Each draft response shall also identify revisions to the document, if any, resulting from the comment.
- 2) After this meeting, NMED may withdraw its disapproval and submit to DOE a formal, written response that approves the document or approves the document with modifications agreed upon as a result of the meeting.
- 3) After this meeting, DOE may revise and submit to NMED the revised document based on NMED's disapproval comments and the resolution of comments agreed upon at the meeting. If DOE elects to submit a revised document, DOE shall include a final written response to each of NMED's disapproval comments with its revised document.

- 4) If DOE's DAM does not request a meeting, DOE may revise the document and resubmit to NMED without a meeting. In this case, DOE shall include a written response to each of NMED's disapproval comments with its revised document.
- 5) Upon DOE's submission of a revised document, NMED shall review DOE's revised document and shall submit to DOE a formal, written response which shall approve the document as revised, approve with modifications, or disapprove the document. If NMED disapproves the document, NMED shall provide written comments that identify the reasons for the disapproval.

H. If NMED disapproves a revised document pursuant to Subsection G, the Parties shall use the dispute resolution process provided in Section XXV (Dispute Resolution) to resolve disapproval comments. This dispute resolution process shall determine the actions, if any, required to reach a resolved document.

I. The Parties agree that, during the comment resolution process, NMED may raise comments for discussion intended to impact future document submissions if intended to improve quality or efficiency. The DAMs will be notified of such comments and meet to discuss as needed.

J. NMED may at any time request additional work, including field modifications, remedial investigatory work, or engineering evaluations, which NMED believes is necessary to accomplish the requirements of this Consent Order. Such requests shall be in writing to DOE and provide explicit justification for the additional work relative to defined, site/project-specific objectives. DOE agrees to give full consideration to all such requests. In response to such requests, DOE may either (1) accept any such requests and incorporate them into future work plan or (2) request a meeting of the DAMs to further discuss the request.

K. Should additional work be required pursuant to Subsection J, as appropriate, Appendices B and/or C to this Consent Order may be modified in accordance with Section VIII (Campaign Approach) and Section XXVIII (Extensions) of this Consent Order.

L. Newly-discovered SWMUs and AOCs shall be addressed under Section X (Newly Discovered Releases) of this Consent Order, rather than as additional work under Subsections J and K.

## **XXIV. NOTIFICATION AND SUBMISSION**

A. For documents submitted to NMED under this Consent Order, DOE shall submit two hard copies and one electronic copy.

B. Unless otherwise specified, submittals provided to NMED or correspondence sent to DOE pursuant to this Consent Order shall be sent by certified mail, return receipt requested, hand-delivered, or similar method (including electronic transmission) which provides a written record of the sending and receiving dates. Should submittals be provided through electronic transmission, hard copies shall also be provided as soon as practicable. Submittals shall be addressed to the following persons:

1) NMED

Chief, Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303

2) DOE/EM ADDRESS

U.S. Department of Energy  
Environmental Management  
Los Alamos Field Office  
1900 Diamond Drive, MS-M984  
Los Alamos, New Mexico 87544

C. Any Party may, by written notice to the other Party, change its designated recipient or notice address provided above.

D. Notices submitted pursuant to this Section shall be deemed submitted upon receipt, unless otherwise provided in this Consent Order or by mutual agreement of the Parties in writing.

E. The Parties agree that electronic transmissions made during normal business hours fulfill the submission requirements if DOE is unable to provide the hard copy submission by the submission deadline.

## **XXV. DISPUTE RESOLUTION**

A. Any dispute that arises under this Consent Order shall be subject to the procedures of this section unless the Consent Order expressly excludes such dispute from dispute resolution. However, the Parties agree to attempt to resolve areas of disagreement and topics of potential dispute through the regular or required coordination among DAMs and designated staff.

B. Any dispute that arises under this Consent Order shall in the first instance be the subject of informal negotiations among or between the Parties' staff engaged in the dispute. The period for informal negotiations shall not exceed twenty business days from the date the dispute arises, unless the period is extended by written agreement of the Parties to the dispute. To initiate a dispute, the complaining Party's DAM shall send the other Party's DAM a written notice (email is acceptable). Such notice shall describe in detail the disputed issue, the basis for and significance of the dispute, and a proposed resolution. The dispute shall be considered to have arisen when the receiving Party receives the written notice of dispute from the complaining Party.

C. If the Parties are unable to resolve a dispute by informal negotiation under Subsection B, the dispute shall be elevated to NMED Resource Protection Division, Division Director (or successor Division), and DOE, Office of Environmental Management, Los Alamos Field Office, Office of Quality and Regulatory Compliance, Director (the "Tier 1 Officials"). Within ten business days after the expiration of the informal dispute resolution period, the DAMs (or their staff) shall submit a written statement of position to the Tier 1 Officials. The written statements of position shall document which specific milestones within Appendix B are involved or impacted by the dispute. The Tier 1 Officials shall review the written statements of position and shall meet and confer in an attempt to resolve the dispute. The period for Tier 1 negotiations shall not exceed fifteen business days from the date the Tier 1 Officials receive the Parties' written statements of position, unless the period is extended by written agreement of the Parties to the dispute.

D. If the Parties are unable to resolve a dispute by Tier 1 negotiations under the preceding Subsection, the matter shall be immediately elevated to NMED Deputy Secretary and DOE, Office of Environmental Management, Los Alamos Field Office, Manager (the "Tier 2

Officials”). The Tier 2 Officials shall review the Parties’ written statements of position and shall meet and confer in an attempt to resolve the dispute. The period for Tier 2 negotiations shall not exceed fifteen business days from the date the Tier 2 Officials receive the statements, unless the period is extended by written agreement of the Parties to the dispute.

E. If the Parties are unable to resolve a dispute by Tier 2 negotiations under the preceding Subsection, the Parties may agree to seek to resolve the dispute through non-binding mediation or another non-binding dispute resolution method, or the Parties may pursue any available legal remedy to resolve the dispute, which may include, for NMED, bringing an enforcement action or, for DOE, petitioning a court to resolve the matter. The decision or other action forming the basis of the dispute shall be deemed final for purposes of judicial review once the Tier 2 negotiations are complete.

F. The deadline for any obligation of DOE under this Consent Order that is directly affected by a dispute raised pursuant to this Section shall be held in abeyance until the dispute is resolved. The invocation of the dispute resolution process shall not, however, extend, postpone, or affect in any way any obligations of DOE under this Consent Order not directly in dispute, unless otherwise agreed by NMED in writing. Stipulated penalties attributable to the disputed matter shall continue to accrue, but payment shall be stayed pending resolution of the dispute. If NMED prevails in the dispute, DOE shall pay all accrued stipulated penalties, plus accrued interest, in accordance with Section XXXV (Stipulated Penalties).

## **XXVI. QUALITY ASSURANCE/DATA MANAGEMENT/DATA REVIEW**

A. Samples collected by DOE during investigations, monitoring, or other activities conducted pursuant to this Consent Order shall be analyzed using EPA and industry-wide accepted practices and procedures. Analytical methods used by DOE for sample analysis shall have detection limits consistent with site/project-specific Data Quality Objectives and approved by NMED. Contract analytical laboratories used by DOE shall maintain internal quality assurance programs in accordance with EPA and industry-wide accepted practices and procedures and which meet EPA’s laboratory certification requirements. Laboratory analytical data shall be validated using data validation procedures consistent with EPA guidelines.

B. DOE commits to maintaining a publicly accessible database containing all data from analysis of environmental media samples collected by DOE as part of environmental investigations and monitoring under this Consent Order or the 2005 Consent Order, and all historical data presented in documents prepared under this Consent Order or the 2005 Consent Order.

C. By the fifteenth (15) day of each month, DOE shall review the analytical data from all groundwater monitoring conducted under this Consent Order that was received during the previous month, and shall record the date of such review; provided, however, that if the fifteenth day of a month is a non-business day, then the review shall be conducted by the next business day. DOE shall notify NMED orally within one business day after review of the analytical data if such data show detection of a Contaminant in a well screen interval or spring at a concentration that exceeds either the New Mexico water quality standard or the federal maximum contaminant level for the first time in such well screen interval or spring.

D. DOE shall notify NMED in writing within fifteen days after review of the analytical data if the data show any of the following:

- 1) Detection of a Contaminant that is an organic compound in a spring or screened interval of a well if that Contaminant has not previously been detected in the spring or screened interval.
- 2) Detection of a Contaminant that is a metal or other inorganic compound at a concentration above the background level in a spring or screened interval of a well if that Contaminant has not previously exceeded the background level in the spring or screened interval.
- 3) Detection of a Contaminant in a spring or screened interval of a well at a concentration that exceeds the lower of either one-half the New Mexico water quality standard or one-half the federal maximum contaminant level, or if there is no such standard for the Contaminant, one-half the Tap Water Screening Levels in Table A-1 of NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (2015 or updates, as appropriate), or if there is no NMED Tap Water Screening Level available for a Contaminant, use one-half the EPA Regional Human Health Medium-Specific Screening Level for tap

water, if that Contaminant has not previously exceeded one-half such standard or screening level in the spring or screened interval.

- 4) Detection of a Contaminant that is a metal or other inorganic compound in a spring or screened interval of a well at a concentration that exceeds two times the background level for the third consecutive sampling of the spring or screened interval.
- 5) Detection of a Contaminant in a spring or screened interval of a well at a concentration that exceeds either one-half the New Mexico water quality standard or one-half the federal maximum contaminant level, and that has increased for the third consecutive sampling of that spring or screened interval.

E. The written notification shall be submitted to NMED in a letter report that includes in table format, at a minimum, the date or dates of the sampling event, an identification of the well or spring, the location of the well or spring, the depth of the screened interval of the well or zone sampled, a list of the analytical data that triggered the reporting requirement, any known issues with sample quality, and the specific category for which the data is reported under this Section.

F. DOE shall develop and maintain an e-mail notification list to notify members of the public concerning groundwater analytical data reported under this Section. DOE shall provide a link on an appropriate DOE webpage whereby members of the public may submit a request to be placed on this list. Within five business days of submittal to NMED of the written notification under this Section, DOE shall post a notice on this webpage and shall notify those on the e-mail notification list.

## **XXVII. ACCESS / DATA/ DOCUMENT AVAILABILITY**

A. In accordance with section 74-4-4.3 of the HWA, for purposes of enforcing the requirements of this Consent Order, DOE shall allow any authorized representative of NMED to enter the Facility at reasonable times and in accordance with applicable security requirements: (1) to inspect the Facility; (2) to obtain samples of any hazardous waste or environmental media; and (3) to inspect and copy documents relating to this Consent Order, subject to applicable security restrictions related to classified information. With the exception of

unannounced inspections, NMED inspections will be previously arranged and coordinated, and DOE will honor all reasonable requests for access made by NMED.

B. DOE shall notify NMED in writing or by e-mail or fax of any field sampling activities undertaken pursuant to any plan or requirement of this Consent Order a minimum of 15 days prior to the sampling being conducted as required to meet the terms of this Consent Order, and shall provide NMED the opportunity to collect split samples upon request of NMED. For such events, DOE should provide NMED as much advance notice as is practicable (i.e., more than 15-days, if possible).

C. DOE shall notify NMED in writing or by e-mail or fax a minimum of 15 days prior to the implementation of any plan required under this Consent Order.

D. Nothing in this Section shall be construed to limit or impair in any way the inspection and entry authority of NMED under the HWA, the Hazardous Waste Regulations, RCRA, or any other applicable law or regulations.

E. If any work under this Consent Order is required on or requires access to property not owned or controlled by DOE, DOE shall use their best efforts to obtain access from the present owners of such property to conduct required activities, and to allow NMED access to such property to oversee such activities. In the event that access is not obtained, DOE shall notify NMED in writing regarding DOE's best efforts and the failure to obtain such access. Such work will become "Deferred" until the time that access issues are resolved. Additionally, provided DOE is denied access despite its best efforts, NMED will not take enforcement action, including pursue stipulated penalties, against DOE for failure to complete corrective action activities on property not owned or controlled by DOE or that requires access to property not owned or controlled by DOE.

F. Information, records, or other documents produced under the terms of this Consent Order by the Parties shall be available to the public except (a) those identified to NMED by DOE as classified, or unclassified but controlled, within the meaning of and in conformance with the AEA, or (b) those that could otherwise be withheld pursuant to the Freedom of Information Act or the Privacy Act, unless expressly authorized for release by the originating agency. Documents or information so identified shall be handled in accordance with applicable laws and regulations. If any information, record, or other document is final and no confidentiality claim accompanies information which is submitted to any Party, then the

information, record, or document may be made available to the public without further notice to the originating Party.

## **XXVIII. EXTENSIONS**

A. A milestone shall be extended upon receipt of a timely request for extension and when good cause exists for the requested extension. If an extension due to good cause affects any milestone in Appendix B, the revised milestone will be incorporated into Appendix B pursuant to the process set forth in Section VIII.C (Campaign Approach). Moreover, targets related to the revised milestone shall also be extended, consistent with the revised milestone and also pursuant to the process set forth in Section VIII.C (Campaign Approach).

B. A request for an extension shall be made in writing prior to the milestone listed in Appendix B. If extraordinary circumstances preclude DOE from providing a written extension request in accordance with this Section, DOE may notify NMED orally or by e-mail (distinct from electronic transmission) and follow up in writing within 72 hours. Any written request shall be provided to NMED pursuant to Section XXIV (Notification). The written request shall specify:

- 1) The milestone that is sought to be extended;
- 2) The length of the extension sought;
- 3) The good cause(s) for the extension; and
- 4) Any related milestones or targets that would be affected if the extension were granted.

C. Examples of good cause for an extension include but are not limited to:

- 1) An event of force majeure and recovery from force majeure;
- 2) A delay caused by the good faith invocation of dispute resolution or the initiation of judicial action;
- 3) A delay caused, or which is likely to be caused, by the grant of an extension in regard to another milestone;
- 4) A delay caused by NMED's inability to meet review schedules consistent with Section XXIII.D.

- 5) A delay caused because of additional work added pursuant to Section XXIII.J and XXIII.K.
- 6) Unanticipated breakage or accident to machinery, equipment, or lines of pipe;
- 7) Any other event or series of events, including but not limited to new technical information or technological barriers mutually agreed to by the Parties as constituting good cause.

D. Within fifteen (15) business days of receipt of a written request for an extension of a milestone in Appendix B, NMED shall provide written response to DOE with approval or disapproval, including a justification for disapproval. NMED's failure to respond within fifteen (15) business days shall result in an automatic extension of time for DOE, and such extension would be incorporated into the next scheduled revision of Appendix B.

E. A timely and good faith request for an extension shall toll any assessment of stipulated penalties or application for judicial enforcement of the affected milestone until a decision is reached on whether the requested extension will be approved. Following the grant of an extension, an assessment of stipulated penalties, as defined in Section XXXV (Stipulated Penalties), or an application for judicial enforcement may be sought only to compel compliance with the revised milestone date.

## **XXIX. RETENTION OF RECORDS**

A. DOE shall maintain all records, documents, data, and other information required to be prepared under this Consent Order for ten years after DOE's receipt of NMED's written notice of termination of the Consent Order pursuant to Section XXXVII (Termination). The only exception to this requirement relates to:

- 1) Those SWMUs and AOCs which have received a Certificate of Completion With Controls pursuant to Section XXI (Certification of Completion) and for which controls are being implemented and enforced under the Facility's Hazardous Waste Permit.
- 2) Those SMWUs and AOCs identified as "Deferred" in Appendix A at the time of Termination of this Consent Order and for which corrective actions will be implemented under the Facility's Hazardous Waste Permit.

B. Nothing herein shall be construed as a waiver of any attorney-client, work product, or other privilege that DOE might otherwise possess.

### **XXX. FUNDING**

A. It is the expectation of the Parties that all obligations of DOE arising under this Consent Order will be fully funded through Congressional appropriations. Consistent with Congressional limitations on future funding, DOE shall take all necessary steps and use its best efforts to obtain timely funding to meet its obligations under this Consent Order, including, but not limited to, the submission of timely budget requests.

B. Nothing in this provision herein shall be interpreted to require obligation or payment of funds in violation of the Antideficiency Act, 31 U.S.C. § 1341.

C. NMED reserves the right to revise and/or adjust review times or any other time commitments pursuant to this Consent Order due to State funding limitations.

### **XXXI. COMPLIANCE WITH LAWS**

DOE shall undertake all actions required by this Consent Order in accordance with the requirements of all applicable federal, state, and local laws and regulations. Nothing in this Consent Order shall be construed as relieving DOE of the obligation to comply with applicable law. NMED shall not require DOE to implement any actions under this Consent Order that would result in noncompliance with other State and Federal requirements.

### **XXXII. FORCE MAJEURE**

A. A Force Majeure shall mean any event arising from causes beyond the control of DOE or its respective agents, contractors, or employees that causes a delay in or prevents the performance of any obligations of DOE under this Consent Order. A force majeure event shall not include unanticipated or increased costs or expenses associated with the implementation of this Consent Order.

B. A Force Majeure could include, but is not limited to:

- 1) Act of God, natural disasters such as fire or flood, war, terrorism, insurrection, civil disturbance, or explosion;
- 2) A federal government shutdown, including lapse of appropriations;
- 3) Restraint by court order or order of public authority;
- 4) Inability to obtain, at reasonable cost and after exercise of reasonable diligence, any necessary authorizations, approvals, permits, or licenses due to action or inaction of any governmental agency or authority other than DOE;
- 5) Delays caused by compliance with applicable statutes or regulations governing contracting, procurement, or acquisition procedures despite the exercise of reasonable diligence; and
- 6) Any strike or other labor dispute, whether or not within the control of the Parties affected thereby.

C. DOE's failure to comply with any obligation under this Consent Order that is caused by a force majeure event, such as an event listed in Subsection B above, is not a violation of this Consent Order.

D. DOE shall notify NMED within seven days after DOE becomes aware of a force majeure event and shall take all reasonable measures to minimize and mitigate any delay. In its notification, DOE shall identify and provide to NMED the delay expected for corrective action activities affected by the force majeure and provide appropriate justification for the length of the delay needed to account for the force majeure and sufficient recovery. Provided NMED agrees with the justification for the length of the delay, NMED shall grant an extension pursuant to Section XXVIII (Extensions).

### **XXXIII. MODIFICATION**

A. This Consent Order may be modified by agreement of DOE and NMED. All modifications shall be in writing and shall become effective upon the date on which such modifications are signed by both DOE and NMED. Pursuant to Section VII (Relationship to Permits), modifications of this Consent Order are not subject to the requirements in 40 CFR § 270.42.

B. No informal advice, guidance, suggestions, or comments by NMED shall be construed to expand or reduce any obligation of DOE under this Consent Order unless documented as formal modification to the Order pursuant to Subsection A of this Section.

C. Should a modification(s) to the Consent Order be proposed that may potentially affect the priorities of any municipality, county or pueblo that shares a common border with the Facility as well as the Four Accord Pueblos, NMED must confer with appropriate representatives of such municipalities, counties and pueblos and allow them to comment on the proposed modification(s). These comments shall be considered when modifying the Consent Order.

#### **XXXIV. COVENANT NOT TO SUE / RESERVATION OF RIGHTS**

A. **Covenant Not to Sue:** In consideration of the actions that will be performed by DOE under the terms of this Consent Order, and except as specifically provided in Subsection B (Reservation of Rights), NMED's covenants not to sue or take administrative action against DOE, their respective officers, agents, successors, or assigns, under the HWA, the SWA, or RCRA, for matters within the scope of this Consent Order. This covenant not to sue shall take effect upon the Effective Date of this Consent Order. This covenant not to sue extends only to DOE and its respective officers, agents, successors, and assigns and does not extend to any other person. This covenant not to sue shall survive the Termination of this Consent Order in accordance with the terms set forth in Section XXXVII.

**B. Reservation of Rights:**

- 1) Nothing herein shall prevent NMED from seeking legal or equitable relief, either administratively or judicially, to enforce the requirements of this Consent Order. Moreover, nothing herein shall prevent NMED from taking administrative action to implement the requirements of this Consent Order (e.g., approving or disapproving work plans, issuing certificates of completion). Finally, nothing herein shall prevent NMED from taking appropriate action to address conditions at the Facility that constitute an emergency situation or that present an immediate threat to public health or the environment.

- 2) The covenant not to sue set forth in Subsection A does not pertain to any matters not within the scope of this Consent Order. NMED reserves, and this Consent Order is without prejudice to, all rights against DOE with respect to all such other matters, including, but not limited to, the following:
  - a) Liability arising from the past, present, or future disposal or release of Contaminants outside the Facility to the extent NMED obtains information concerning such disposal or release following Termination of this Consent Order and such information was not available to NMED at the time of termination;
  - b) Liability arising from the future disposal or release of Contaminants at the Facility to the extent NMED obtains information concerning such disposal or release following Termination of this Consent Order and such information was not available to NMED at the time of termination;
  - c) Liability for damages for injury to, destruction of, or loss of natural resources and the costs of any natural resource damage assessment or other related costs, and liability for damages under any federal or state statute (except for such liability, if any, under the HWA, SWA or RCRA) or federal or state common law, for past, present or future releases of contaminants to the environment;
  - d) Criminal liability; and
  - e) Liability for violation of federal or state law, which occurs during or after implementation of the corrective action.

## **XXXV. STIPULATED PENALTIES**

### **A. Process and Notice**

- 1) Milestones subject to stipulated penalties shall be determined in accordance with Section VIII (Campaign Approach).

- 2) For each FY between the effective date and termination of this Consent Order, the milestones listed in Appendix B for the current FY shall be subject to stipulated penalties.
- 3) A milestone for which NMED grants an extension pursuant to Section XXVIII (Extensions) beyond the current FY is no longer a milestone.
- 4) Consistent with RCRA practice, for each failure of DOE to meet a milestone subject to stipulated penalties, NMED may assess a stipulated penalty in the amounts and pursuant to the procedures set forth in this section. Stipulated penalties will not be paid from appropriated funds authorized to be expended at the Los Alamos National Laboratory for the purpose of environmental cleanup, as long as there is a specific appropriation for the purpose of paying such stipulated penalties or other monies become available through DOE's contractor accountability provisions referenced in Section V.B of this Consent Order. In the event stipulated penalties are assessed, DOE shall request a specific appropriation or utilize DOE's contractor accountability provisions referenced in Section V.B of this Consent Order in order to pay such stipulated penalties.
- 5) If NMED seeks to assess stipulated penalties pursuant to this section, it shall provide written notice of intent do so to DOE. Such written notice of intent shall state the violation for which penalties are being assessed. If NMED issues such written notice within 15 days of the date the milestone comes due as identified in Appendix B, NMED may assess stipulated penalties beginning with the day after the milestone date. If NMED provides written notice 16 days or more after the date the milestone comes due, NMED may only assess stipulated penalties beginning on the date that written notice was given to DOE pursuant to this Section.
- 6) Consistent with the beginning dates for assessment of stipulated penalties set forth in this Section and only after receipt of written demand for payment discussed below, DOE shall pay to the State the following stipulated penalties for each day of noncompliance:
  - a) Day 1 through 30: \$2,000.00 per day

- b) Days 31 and beyond: \$4,000.00 per day
- 7) NMED may, in its discretion, agree to reduce or waive the stipulated penalties that would otherwise be due under this Section.
- 8) As the Parties agree that the use of Supplemental Environmental Projects (SEPs) is often a preferable mechanism to fulfill a stipulated penalty obligation, NMED may, in its discretion, approve DOE's use of SEPs to satisfy any stipulated penalties issued pursuant to this Consent Order.
  - a) Any SEP proposed by DOE must be:
    - (1) Environmentally beneficial, such that it improves, protects or reduces risks to public health or the environment for one or more areas and communities adjoining the Facility or one or more of the Four Accord Pueblos (Jemez Pueblo, Cochiti Pueblo, Pueblo de San Ildefonso and Santa Clara Pueblo);
    - (2) A project that DOE had not already initiated before the stipulated penalty was issued; and
    - (3) Not otherwise required by federal, state or local law or regulation.
  - b) NMED agrees to consider any SEP proposal(s) meeting the criteria found in subsection A.8 (a) (1) - (3) above. Upon written submission of a SEP proposal(s) by DOE and during consideration of such SEP proposal(s) by NMED, the remittance of any stipulated penalties associated with the proposed SEP(s) shall be tolled. Should NMED decline to accept a proposed SEP to satisfy a stipulated penalty, such decision shall not be subject to the Dispute Resolution provisions in Section XXV of this Consent Order.
- 9) DOE shall only be liable for stipulated penalties for failure to meet a milestone listed in Appendix B developed pursuant to Section VIII.C of this Consent Order.

**B. Procedure for Payment**

- 1) Stipulated penalties under this Section shall be due within 45 days from the date that NMED makes a written demand for payment of stipulated penalties (which

is distinct from the written notice of intent to assess stipulated penalties described in Subsection A of this Section).

- 2) Interest shall accrue on all stipulated penalties not paid when due at the rate specified in 28 U.S.C. §1961. Interest shall accrue from the date the penalty is due until the date it is actually paid.
- 3) Payment shall be made by DOE, either by wire into an account that NMED so designates or by check payable to the State of New Mexico and delivered to:

Chief, Hazardous Waste Bureau  
New Mexico Environmental Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303

- 4) Payment shall be accompanied by a transmittal letter referencing this Consent Order. A copy of the transmittal letter shall be delivered to the attorney for NMED at the following address:

First class mail address:  
Office of General Counsel  
New Mexico Environment Department  
Post Office Box 5469  
Santa Fe, New Mexico 87502

Overnight delivery address:  
Office of General Counsel  
New Mexico Environment Department  
1190 St. Francis Drive  
Santa Fe, New Mexico 87501

C. Reservation: NMED reserves the right to seek other appropriate relief, in lieu of stipulated penalties under this section for any failure of DOE to meet milestones subject to stipulated penalties. If, however, NMED elects to assess stipulated penalties pursuant to the provisions of this section, NMED will not seek a separate civil penalty or other monetary relief for the alleged noncompliance identified in NMED notice pursuant to Subsection A above (Process and Notice).

## **XXXVI. ENFORCEABILITY**

A. This Consent Order is an enforceable document. If DOE violates any requirements of this Consent Order, the State's sole remedy for such noncompliance shall be to enforce those requirements pursuant to applicable law, subject, however, to the provisions of Section XXXV (Stipulated Penalties), which apply where the State has sought stipulated penalties pursuant to this Consent Order.

B. The State may take the following actions, or some combination of the following actions, to enforce the requirements of this Consent Order: issue a compliance order under section 74-4-10 of the HWA seeking injunctive relief or civil penalties for DOE's noncompliance with the requirements of the Consent Order; file a civil action under sections 74-4-10 and 74-4-10.1(E) of the HWA or section 7002(a) of RCRA, 42 U.S.C. § 6972(a), seeking injunctive relief or civil penalties for alleged violations of the Consent Order; and file an action seeking criminal penalties under section 74-4-11 of the HWA. Each requirement of this Consent Order is an enforceable "requirement" of the HWA within the meaning of Section 74-4-10 and an enforceable "requirement" of RCRA within the meaning of Section 7002(a)(1)(A), 42 U.S.C. Section § 6972(a)(1)(A). The State further maintains that the list of authorities identified in this paragraph is not exhaustive and reserves all rights to take any action authorized by law to enforce the requirements of this Consent Order. The State maintains that citizens may sue to enforce the requirements of this Consent Order pursuant to section 7002(a) of RCRA, 42 U.S.C. § 6972(a), if DOE violates those requirements.

C. DOE reserves any and all rights and defenses to any enforcement action taken by the State or any citizen, and nothing in this Consent Order will constitute a waiver of such rights or defenses.

## **XXXVII. TERMINATION**

A. The Parties agree that termination of this Consent Order will occur when all corrective action activities pursuant to this Consent Order are completed with the exception of

sites to be addressed under the Permit consistent with Section VII.A. DOE shall notify NMED of its completion in writing and shall include sufficient documentation of such completion.

B. This Consent Order shall terminate on the date that DOE receives written notice from NMED that DOE has demonstrated that the terms of this Consent Order have been satisfactorily completed. NMED will provide such written notice within 60 days of receipt of DOE's notice of completion.

C. If NMED identifies requirements of the Consent Order that have not been completed, it will notify DOE in writing within 60 days of receipt of DOE's notice of completion of those specific requirements that have not been met and the activities that must be taken by DOE to complete those requirements.

### **XXXVIII. EFFECTIVE DATE**

The effective date of this Consent Order is the date on which all of the Parties have signed the Consent Order.

### **APPENDICES**

#### **LIST OF ACRONYMS**

#### **APPENDIX A-SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN LIST**

#### **APPENDIX B-MILESTONES AND TARGETS**

#### **APPENDIX C-FUTURE CAMPAIGNS**

#### **APPENDIX D-DOCUMENT REVIEW/COMMENT AND REVISION SCHEDULE**

#### **APPENDIX E-EXAMPLE DOCUMENT TEMPLATES**

#### **APPENDIX F-SAMPLING/ANALYTICAL/FIELD METHOD REGULATORY GUIDANCE**

This Consent Order is hereby AGREED and CONSENTED TO by the Parties, pursuant to  
Section V.A:

 24 June 2016

Ryan Flynn

Date:

Cabinet Secretary

New Mexico Environment Department

 20 June 2016

Douglas Hintze

Date:

Manager, Environmental Management Los Alamos Field Office

U.S. Department of Energy

Pursuant to Section 1003III of the 2016 Compliance Order on Consent, this Modification is hereby  
AGREED and CONSENTED TO by the Parties:

Butch Tongate                      2/21/17

Butch Tongate

Date

Cabinet Secretary-Designate

New Mexico Environment Department

FOR: Stephen A. Hoffman                      1/31/17

Douglas Hixson

Date

Manager, Environmental Management Los Alamos Field Office

U.S. Department of Energy

## LIST OF ACRONYMS

AOC	Area of Concern
C.F.R.	Code of Federal Regulations
CME	Corrective Measures Evaluation
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
DAM	Designated Agency Manager
DOE	Department of Energy
DQO	Data Quality Objectives
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Level
HI	Hazard Index
HMX	High Melting Explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)
HQ	Hazard Quotient
HSWA	Hazardous and Solid Waste Amendments
HWA	New Mexico Hazardous Waste Act, NMSA 1978, §§74-4-1 et seq.
IFGMP	Interim Facility-Wide Groundwater Monitoring Plan
IM	Interim Measures
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
MCL	Maximum Contaminant Level
MDA	Material Disposal Area
NMAC	New Mexico Administrative Code

NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation Recovery Act, 42 U.S.C. Section 6901 et seq.
RDX	Royal Demolition Explosive (cyclonitrite)
RFI	RCRA Facility Investigation
SSL	Soil Screening Level
SWA	New Mexico Solid Waste Act, NMSA 1978, §§ 74-9-1 to -43.
SWMU	Solid Waste Management Unit
TA	Technical Area
TNT	Trinitrotoluene
WQCC	Water Quality Control Commission

APPENDIX A  
SOLID WASTE MANAGEMENT UNIT/AREA OF  
CONCERN LIST

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1	SWMU	00-001	Sediment Traps in Mortandad Canyon	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
2	SWMU	00-011(a)	Former Mortar Impact Area	CoC with Controls	5/7/2013	
3	SWMU	00-011(c)	Mortar Impact Area	CoC without Controls	5/16/2012	
4	SWMU	00-011(d)	Mortar Impact Area	CoC with Controls	5/7/2013	
5	SWMU	00-011(e)	Mortar Impact Area	CoC with Controls	5/7/2013	
6	AOC	00-015	Firing Range-Rendija Canyon	Deferred Site		
7	SWMU	00-017	Waste lines	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
8	SWMU	00-018(a)	Former Sludge Bed Wastewater Treatment Plant, Pueblo Canyon	CoC without Controls	1/28/2015	
9	AOC	00-018(b)	Sludge-Bed Wastewater Treatment Plant	CoC without Controls	1/13/2011	
10	SWMU	00-019	Former Wastewater Treatment Plant, Central	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
11	AOC	00-027	Storage Area-DP Road	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Upper LA Cyn
12	SWMU	00-030(a)	Former Septic Tank	CoC without Controls	2/23/2006	
13	SWMU	00-030(b)	Septic Tanks	CoC without Controls	2/23/2006	
14	AOC	00-030(d)	Septic Tank	CoC without Controls	12/30/2008	
15	AOC	00-030(eN)	Septic Tanks	CoC without Controls	12/30/2008	
16	AOC	00-030(eS)	Septic Tank	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
17	AOC	00-030(f)	Septic Tank	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
18	SWMU	00-030(g)	Former Septic tank (near old Catholic Church parking lot)	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
19	AOC	00-030(h)	Former Septic tank (near new Catholic Church)	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
20	AOC	00-030(j)	Septic Tank	CoC without Controls	12/30/2008	
21	SWMU	00-030(i)	Septic Tank	CoC without Controls	2/23/2006	
22	AOC	00-030(k)	Septic System-Cannot be located	CoC without Controls	12/6/2006	
23	SWMU	00-030(m)	Former Septic Tank	CoC without Controls	2/23/2006	
24	AOC	00-030(n)	Former Septic Tank	CoC without Controls	12/30/2008	
25	AOC	00-030(o)	Septic Tank	CoC without Controls	12/30/2008	
26	AOC	00-030(p)	Septic Tank	CoC without Controls	12/30/2008	
27	AOC	00-031(a)	Soil Contamination from former Service Station	CoC without Controls	9/10/2010	
28	AOC	00-031(b)	Soil Contamination from former motor pool facility	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Upper LA Cyn
29	SWMU	00-033(a)	Soil contamination from former UST, 6th Street Warehouses	CoC without Controls	2/23/2006	
30	AOC	00-034(b)	Landfill, Western Area	CoC without Controls	9/10/2010	
31	SWMU	00-039	Soil contamination from former USTs	CoC without Controls	12/30/2008	
32	AOC	C-00-001	Guaje Canyon	RFI or Field Work Rpt Submitted to NMED		Other
33	AOC	C-00-002	Rendija Canyon	RFI or Field Work Rpt Submitted to NMED		Other
34	AOC	C-00-003	Barrancas Canyon	RFI or Field Work Rpt Submitted to NMED		Other
35	AOC	C-00-004	Bayo Canyon	RFI or Field Work Rpt Submitted to NMED		Other
36	AOC	C-00-005	Puebln Canyon	RFI or Field Work Rpt Submitted to NMED		Other
37	AOC	C-00-006	Los Alamos Canyon	RFI or Field Work Rpt Submitted to NMED		Other
38	AOC	C-00-007	Sandia Canyon	RFI or Field Work Rpt Submitted to NMED		Other
39	AOC	C-00-008	Mortandad Canyon	RFI or Field Work Rpt Submitted to NMED		Chromium IM&Characterization
40	AOC	C-00-009	Canada del Bucy Canyon	RFI or Field Work Rpt Submitted to NMED		Other
41	AOC	C-00-010	TwoMile Canyon	RFI or Field Work Rpt Submitted to NMED		Other
42	AOC	C-00-011	Pajarito Canyon	RFI or Field Work Rpt Submitted to NMED		Other
43	AOC	C-00-012	Three Mile Canyon	RFI or Field Work Rpt Submitted to NMED		Other
44	AOC	C-00-013	Patriillo Canynn	RFI or Field Work Rpt Submitted to NMED		Other
45	AOC	C-00-014	Canon de Valle Canyon	RFI or Field Work Rpt Submitted to NMED		Other
46	AOC	C-00-015	Fence Canyon	RFI or Field Work Rpt Submitted to NMED		Other
47	AOC	C-00-016	Water Canyon	RFI or Field Work Rpt Submitted to NMED		Other

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
48	AOC	C-00-017	Indio Canyon	RFI or Field Work Rpt Submitted to NMED		Other
49	AOC	C-00-018	Ancho Canyon	RFI or Field Work Rpt Submitted to NMED		Other
50	AOC	C-00-019	Chaquehui Canyon	RFI or Field Work Rpt Submitted to NMED		Other
51	AOC	C-00-020	Mortar impact area	CoC without Controls	5/16/2012	
52	AOC	C-00-021	DP Canyon	RFI or Field Work Rpt Submitted to NMED		Other
53	AOC	C-00-037	Landfill, Bandelier, NM	CoC without Controls	1/31/2011	
54	AOC	C-00-038	Surface Disposal, Bandelier, NM	CoC without Controls	1/31/2011	
55	AOC	C-00-041	Asphalt and tar remnant site	RFI or Field Work Rpt Submitted to NMED		Other
56	AOC	C-00-042	Former Underground Storage Tank	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Upper LA Cyn
57	AOC	C-00-043	Former Manhole	CoC without Controls	12/30/2008	
58	AOC	C-00-044	Soil contamination	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
59	SWMU	01-001(a)	Septic Tank 134	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
60	SWMU	01-001(b)	Septic Tank 135	CoC with Controls	9/10/2010	
61	SWMU	01-001(c)	Septic Tank 137	CoC with Controls	9/10/2010	
62	SWMU	01-001(d)	Soil contamination from Septic Tank 138	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
63	SWMU	01-001(e)	Septic Tank 139	CoC with Controls	9/10/2010	
64	SWMU	01-001(f)	Septic Tank 140(hillside)	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
65	SWMU	01-001(g)	Septic Tank 141	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
66	SWMU	01-001(o)	Waste Line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
67	SWMU	01-001(s)	Waste Line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
68	SWMU	01-001(i)	Waste Line	CoC without Controls	9/10/2010	
69	SWMU	01-001(u)	Waste Lines	CoC without Controls	9/10/2010	
70	SWMU	01-002(a)-00	Waste Lines	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Upper LA Cyn
71	SWMU	01-002(b)-00	Outfall associated with TA-01 (Located in former TA-45)	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
72	SWMU	01-003(a)	Landfill	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
73	AOC	01-003(b)	Surface Disposal Site	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
74	AOC	01-003(c)	Surface Disposal Site	CoC without Controls	9/10/2010	
75	SWMU	01-003(d)	Surface Disposal Site	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
76	SWMU	01-003(e)	Surface Disposal Site	CoC with Controls	9/10/2010	
77	SWMU	01-006(a)	Drainline and Outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
78	SWMU	01-006(b)	Drainline and Outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
79	SWMU	01-006(c)	Drainlines and Outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
80	SWMU	01-006(d)	Drainline and Outfall	CoC with Controls	9/10/2010	
81	AOC	01-006(e)	Drainlines and Outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
82	AOC	01-006(g)	Storm drains and outfalls	CoC without Controls	9/10/2010	
83	SWMU	01-006(h)	Storm drain and outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
84	SWMU	01-006(n)	Storm drain and outfall	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
85	SWMU	01-006(o)	Storm drains and outfalls	CoC without Controls	9/10/2010	
86	SWMU	01-007(a)	Soil contamination associated with TA-1 Buildings and Structures	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
87	SWMU	01-007(b)	Soil contamination associated with TA-1 Buildings and Structures	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
88	SWMU	01-007(c)	Soil contamination associated with TA-1 Buildings and Structures	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
89	SWMU	01-007(d)	Soil contamination associated with TA-1 Buildings and Structures	CoC without Controls	9/10/2010	
90	SWMU	01-007(e)	Soil contamination associated with TA-1 Buildings and Structures	CoC without Controls	9/10/2010	
91	SWMU	01-007(j)	Soil contamination associated with TA-1 Buildings and Structures	CoC with Controls	9/10/2010	
92	AOC	01-007(k)	Soil Contamination Area	CoC without Controls	3/16/2015	
93	SWMU	01-007(l)	Soil contamination associated with TA-1 Buildings and Structures	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Upper LA Cyn

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
94	AOC	02-003(a)	Soil contamination associated with former valve house and gaseous effluent line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
95	AOC	02-003(b)	Soil contamination associated with former condensate trap	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
96	AOC	02-003(c)	Soil contamination associated with former delay system	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
97	AOC	02-003(d)	Soil contamination associated with former gaseous effluent line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
98	AOC	02-003(e)	Soil contamination associated with former holding tank (near water boiler reactor)	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
99	AOC	02-004(a)	Former Omega West reactor facility	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
100	AOC	02-004(b)	Former Reactor facility effluent storage tank TA-2-54	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
101	AOC	02-004(c)	Former Reactor facility effluent storage tank TA-2-55	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
102	AOC	02-004(d)	Former Reactor facility effluent storage tank TA-2-56	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
103	AOC	02-004(e)	Former Reactor facility acid pit TA-2-53	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
104	AOC	02-004(f)	Former Reactor facility equipment building	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
105	AOC	02-004(g)	Soil contamination associated with former aboveground tank	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
106	SWMU	02-005	Soil contamination from Drift loss, cooling tower blowdown	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
107	SWMU	02-006(a)	Former French drain	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Middle LA Cyn
108	SWMU	02-006(b)	Former Acid waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
109	AOC	02-006(c)	Former Drainline	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
110	AOC	02-006(d)	Drainline	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
111	AOC	02-006(e)	Former sump	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
112	SWMU	02-007	Soil contamination from former septic system	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
113	SWMU	02-008(a)	Outfall from Structure 02-49	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
114	AOC	02-008(c)	Outfall from Building 2-1	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
115	SWMU	02-009(a)	Soil contamination associated with former water boiler reactor	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
116	SWMU	02-009(b)	Soil contamination associated with former water boiler reactor	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
117	SWMU	02-009(c)	Soil contamination associated with condensate trap and leach field	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
118	AOC	02-009(d)	Soil contamination	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
119	AOC	02-009(e)	Soil contamination (duplicate of SWMU 02-009(c))	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
120	AOC	02-010	Soil contamination associated with former chemical stack 2-3	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
121	AOC	02-011(a)	Storm drains associated with former Building 2-1	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
122	AOC	02-011(b)	Former drains	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
123	AOC	02-011(c)	Storm drain	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
124	AOC	02-011(d)	Outfall from Building 2-44	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
125	AOC	02-011(e)	Outfall from Structure 2-49 (duplicate of 02-008(a))	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
126	AOC	02-012	Soil contamination from former underground tanks	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
127	AOC	03-001(e)	Storage Area	Pre-Investigation		Pajarito Watershed
128	AOC	03-001(i)	Storage Area	CoC with Controls	10/13/2006	
129	SWMU	03-001(k)	Storage Area	Pre-Investigation		Pajarito Watershed
130	SWMU	03-002(c)	Storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
131	SWMU	03-003(a)	Storage area	Pre-Investigation		Pajarito Watershed
132	SWMU	03-003(b)	Storage area	Pre-Investigation		Pajarito Watershed
133	SWMU	03-003(c)	Storage Area	CoC without Controls	2/18/2011	
134	AOC	03-003(d)	Storage area	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
135	AOC	03-003(e)	Storage area	Deferred Site		
136	AOC	03-003(f)	Storage area	Deferred Site		
137	AOC	03-003(g)	Storage area	Deferred Site		
138	AOC	03-003(h)	Storage area	Deferred Site		

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
139	AOC	03-003(i)	Storage area	Deferred Site		
140	AOC	03-003(j)	Storage area	Deferred Site		
141	AOC	03-003(k)	Storage area	Pre-Investigation		Pajarito Watershed
142	AOC	03-003(l)	Storage area	Deferred Site		
143	AOC	03-003(n)	Storage area	CoC without Controls	2/18/2011	
144	AOC	03-003(o)	Storage area	CoC without Controls	2/18/2011	
145	AOC	03-003(p)	Storage area	Pre-Investigation		Pajarito Watershed
146	AOC	03-004(c)	Storage area	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
147	AOC	03-004(d)	Storage area	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
148	AOC	03-007	Firing site	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
149	AOC	03-008(a)	Firing site	CoC with Controls	9/10/2010	
150	SWMU	03-009(a)	Surface disposal site	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
151	SWMU	03-009(i)	Surface disposal site	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
152	SWMU	03-009(j)	Surface disposal site	CoC without Controls	9/10/2010	
153	SWMU	03-010(a)	Former Vacuum repair shop outfall	Pre-Investigation		Pajarito Watershed
154	SWMU	03-011	Operational release	CoC without Controls	1/23/2008	
155	SWMU	03-012(b)	Operational release	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
156	SWMU	03-013(a)	Storm drain	Deferred Site		
157	AOC	03-013(b)	Floor Drains	Deferred Site		
158	SWMU	03-013(i)	Operational release from former Buildings 3-246 and 3-247	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
159	SWMU	03-014(a)	Imhoff tank associated with former WWTP	Deferred Site		
160	AOC	03-014(a2)	Drain associated with former WWTP	Pre-Investigation		Pajarito Watershed
161	SWMU	03-014(b)	Dosing siphon associated with former WWTP	Deferred Site		
162	AOC	03-014(b2)	Outfall associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
163	SWMU	03-014(c)	Trickling filter associated with former WWTP	Deferred Site		
164	AOC	03-014(c2)	Outfall associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
165	SWMU	03-014(d)	Clarifying tank associated with former WWTP	Deferred Site		
166	SWMU	03-014(e)	Imhoff tank associated with former WWTP	Deferred Site		
167	SWMU	03-014(f)	Dosing siphon associated with former WWTP	Deferred Site		
168	SWMU	03-014(g)	Trickling filter associated with former WWTP	Deferred Site		
169	SWMU	03-014(h)	Clarifying tank associated with former WWTP	Deferred Site		
170	SWMU	03-014(i)	Splitter box and bar rack associated with former WWTP	Deferred Site		
171	SWMU	03-014(j)	Chlorination system associated with former WWTP	Deferred Site		
172	SWMU	03-014(k)	Sludge drying bed associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
173	SWMU	03-014(l)	Sludge drying bed associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
174	SWMU	03-014(m)	Sludge drying bed associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
175	SWMU	03-014(n)	Sludge drying bed associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
176	SWMU	03-014(o)	Sludge drying bed associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
177	SWMU	03-014(p)	Lift station associated with former WWTP	Deferred Site		
178	SWMU	03-014(q)	Holding tank	CoC without Controls	2/18/2011	
179	SWMU	03-014(r)	Lift station associated with former WWTP	Deferred Site		
180	SWMU	03-014(s)	Lift station associated with former WWTP	Deferred Site		
181	SWMU	03-014(t)	Lift station associated with former WWTP	Pre-Investigation		Pajarito Watershed
182	SWMU	03-014(u)	Holding tank associated with former WWTP	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
183	AOC	03-014(v)	Drain associated with former WWTP	CoC without Controls	2/18/2011	
184	AOC	03-014(w)	Drain associated with former WWTP	Deferred Site		
185	AOC	03-014(x)	Drain associated with former WWTP	Deferred Site		

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
186	AOC	03-014(y)	Drain associated with former WWTP	Deferred Site		
187	AOC	03-014(z)	Drain associated with former WWTP	Deferred Site		
188	SWMU	03-015	Outfall	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
189	SWMU	03-021	Outfall from Building 3-170	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
190	AOC	03-022	Former Sump	Pre-Investigation		Pajarito Watershed
191	SWMU	03-025(b)	Sumps	Deferred Site		
192	AOC	03-025(c)	Oil/water separator	Pre-Investigation		Pajarito Watershed
193	AOC	03-026(a)	Sump	Deferred Site		
194	SWMU	03-026(c)	Tanks	Deferred Site		
195	SWMU	03-026(d)	Sump	Deferred Site		
196	AOC	03-027	Lift Wells	CoC without Controls	2/18/2011	
197	SWMU	03-028	Surface Impoundment	CoC without Controls	2/18/2011	
198	SWMU	03-029	Asphalt Batch Plant (Disposal Area)	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
199	SWMU	03-031	Tanks and associated equipment	Deferred Site		
200	SWMU	03-033	Former Tanks and Sumps	Pre-Investigation		Pajarito Watershed
201	SWMU	03-034(a)	Tank and/or associated equipment, radioactive liquid waste tanks	Deferred Site		
202	SWMU	03-034(b)	Tank and associated equipment	Deferred Site		
203	SWMU	03-036(a)	Soil contamination from former aboveground tanks	CoC without Controls	2/18/2011	
204	AOC	03-036(b)	Former aboveground tanks	CoC without Controls	2/18/2011	
205	SWMU	03-036(c)	Soil contamination from former aboveground tank (duplicated of 03-043(f))	CoC without Controls	2/18/2011	
206	SWMU	03-036(d)	Soil contamination from former aboveground tank (duplicated of 03-043(g))	CoC without Controls	2/18/2011	
207	SWMU	03-037	Underground tanks	Deferred Site		
208	SWMU	03-038(a)	Soil contamination from former Building 3-700	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
209	SWMU	03-038(b)	Soil contamination from former acid tank	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
210	AOC	03-038(c)	Waste lines	CoC without Controls	2/18/2011	
211	AOC	03-038(d)	Waste lines	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
212	AOC	03-038(f)	Dramline	Pre-Investigation		Pajarito Watershed
213	AOC	03-041	Underground tank	CoC without Controls	9/7/2010	
214	AOC	03-042	Soil contamination from former sump	Pre-Investigation		Pajarito Watershed
215	AOC	03-043(a)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
216	AOC	03-043(b)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
217	SWMU	03-043(c)	Soil contamination from former manhole	Pre-Investigation		Pajarito Watershed
218	AOC	03-043(d)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
219	AOC	03-043(f)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
220	AOC	03-043(g)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
221	AOC	03-043(h)	Soil contamination from former aboveground tank	CoC without Controls	2/18/2011	
222	SWMU	03-045(a)	Outfall from Building 3-22	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
223	SWMU	03-045(b)	Operational release	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
224	SWMU	03-045(c)	Outfall from structure 3-285	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
225	SWMU	03-045(e)	Outfall from Building 3-57	Deferred Site		
226	SWMU	03-045(f)	Outfall from Building 3-223	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
227	SWMU	03-045(g)	Storm drain	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
228	SWMU	03-045(h)	Outfall from cooling tower 3-187	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
229	SWMU	03-046	Above ground wastewater treatment tank	CoC without Controls	1/23/2008	
230	AOC	03-047(d)	Soil contamination from former storage area	CoC without Controls	2/18/2011	

Appendix A  
Solid Waste Management Unit/Area of Concern List

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
231	AOC	03-047(g)	Soil contamination from former storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
232	SWMU	03-049(a)	Outfall from cooling tower 3-127 and Building 3-66	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
233	SWMU	03-049(b)	Soil contamination from discharge area	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
234	SWMU	03-049(c)	Outfall	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
235	SWMU	03-050(a)	Soil contamination from TA-3 exhaust emissions	Pre-Investigation		Pajarito Watershed
236	SWMU	03-050(d)	Soil contamination from TA-3 exhaust emissions	Pre-Investigation		Pajarito Watershed
237	SWMU	03-050(f)	Soil contamination from TA-3 exhaust emissions	Pre-Investigation		Pajarito Watershed
238	SWMU	03-050(g)	Soil contamination from TA-3 exhaust emissions	Pre-Investigation		Pajarito Watershed
239	AOC	03-051(a)	Soil contamination from leaking compressor	Pre-Investigation		Pajarito Watershed
240	AOC	03-051(b)	Soil contamination from leaking compressor	Pre-Investigation		Pajarito Watershed
241	AOC	03-051(c)	Soil contamination from vacuum pump leaking	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
242	SWMU	03-052(a)	Storm drain	Pre-Investigation		Pajarito Watershed
243	AOC	03-052(b)	Storm drainage	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
244	SWMU	03-052(e)	Storm drain	Pre-Investigation		Pajarito Watershed
245	SWMU	03-052(f)	Outfall from Building 3-38	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
246	AOC	03-053	Building 3-141 basement area and floor drains	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
247	SWMU	03-054(a)	Outfall associated with cooling tower 3-19	Pre-Investigation		Pajarito Watershed
248	SWMU	03-054(b)	Outfall from Building 3-38	Pre-Investigation		Pajarito Watershed
249	SWMU	03-054(c)	Outfall from former cooling tower 3-156	Deferred Site		
250	SWMU	03-054(d)	Outfall from Building 3-16	Pre-Investigation		Pajarito Watershed
251	SWMU	03-054(e)	Outfall from Building 3-29	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
252	SWMU	03-055(a)	Outfall from Building 3-16	Pre-Investigation		Pajarito Watershed
253	SWMU	03-055(c)	Outfall associated with drains of Fire Station 3-41	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
254	SWMU	03-056(a)	Oil Storage Facility	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
255	SWMU	03-056(c)	Transformer storage area	CoC with Controls	2/18/2011	
256	SWMU	03-056(d)	Drum storage	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
257	AOC	03-056(h)	Storage Area	Deferred Site		
258	AOC	03-056(k)	Container storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
259	SWMU	03-056(l)	Container Storage Area	CoC without Controls	2/18/2011	
260	SWMU	03-059	Storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
261	AOC	C-03-006	Spill/Non-Intentional Release Area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
262	AOC	C-03-014	Equipment Storage area	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
263	AOC	C-03-016	Former Oil metal bin	CoC without Controls	2/18/2011	
264	AOC	C-03-022	Former Kerosene tanker trailer	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
265	SWMU	04-001	Firing site	CoC without Controls	5/18/2015	
266	SWMU	04-002	Surface Disposal site	CoC without Controls	5/18/2015	
267	SWMU	04-003(a)	Outfall associated with former Photo-processing Building 4-07	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
268	SWMU	04-003(b)	Drainline and outfall from former Building 4-03	CoC without Controls	5/18/2015	
269	AOC	04-004	Soil contamination from former photo-processing Building 4-07	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
270	SWMU	05-001(a)	Firing site	CoC without Controls	9/16/2015	
271	SWMU	05-001(b)	Firing site	CoC without Controls	9/16/2015	
272	AOC	05-001(c)	Firing site	CoC without Controls	9/16/2015	
273	SWMU	05-002	Canyon side disposal site	CoC without Controls	9/16/2015	
274	SWMU	05-003	Calibration Chamber	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
275	SWMU	05-004	Septic Tank	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
276	SWMU	05-005(a)	Soil contamination from former French Drain	CoC without Controls	9/16/2015	
277	SWMU	05-005(b)	Outfall associated with former Building 5-05	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
278	SWMU	05-006(b)	Soil Contamination from former Building 5-04	CoC without Controls	9/16/2015	
279	SWMU	05-006(c)	Soil Contamination from former Building 5-05	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
280	SWMU	05-006(e)	Soil Contamination from former Building 5-19	CoC without Controls	9/16/2015	
281	SWMU	05-006(h)	Soil contamination from former Building 5-09	CoC without Controls	6/30/2011	
282	SWMU	06-001(a)	Septic system	Pre-Investigation		Pajarito Watershed
283	SWMU	06-001(b)	Septic system	Pre-Investigation		Pajarito Watershed
284	SWMU	06-002	Septic System	Pre-Investigation		Pajarito Watershed
285	SWMU	06-003(a)	Firing site	Deferred Site		
286	SWMU	06-003(c)	Firing site	Pre-Investigation		Pajarito Watershed
287	SWMU	06-003(d)	Firing site	Pre-Investigation		Pajarito Watershed
288	SWMU	06-003(e)	Firing site	Pre-Investigation		Pajarito Watershed
289	SWMU	06-003(f)	Firing site	Pre-Investigation		Pajarito Watershed
290	SWMU	06-003(h)	Firing site	Deferred Site		
291	SWMU	06-005	Firing Site	Pre-Investigation		Pajarito Watershed
292	SWMU	06-006	Storage Area	Pre-Investigation		Pajarito Watershed
293	SWMU	06-007(a)	MDA F	Pre-Investigation		Pajarito Watershed
294	SWMU	06-007(b)	Landfill	Pre-Investigation		Pajarito Watershed
295	SWMU	06-007(c)	Landfill	Pre-Investigation		Pajarito Watershed
296	SWMU	06-007(d)	Landfill	Pre-Investigation		Pajarito Watershed
297	SWMU	06-007(e)	Landfill	Pre-Investigation		Pajarito Watershed
298	SWMU	06-007(f)	Surface disposal	Pre-Investigation		Pajarito Watershed
299	SWMU	06-007(g)	Soil contamination from former Building 6-12	Pre-Investigation		Pajarito Watershed
300	AOC	06-008	Soil contamination from former underground storage tank	Pre-Investigation		Pajarito Watershed
301	AOC	C-06-001	Soil contamination from former storage magazine 6-4	Pre-Investigation		Pajarito Watershed
302	AOC	C-06-005	Soil Contamination from former Building 06-13	Pre-Investigation		Pajarito Watershed
303	SWMU	07-001(a)	Firing Site	Pre-Investigation		Pajarito Watershed
304	SWMU	07-001(b)	Firing Site	Pre-Investigation		Pajarito Watershed
305	SWMU	07-001(c)	Firing Site	Deferred Site		
306	SWMU	07-001(d)	Firing Site	Deferred Site		
307	AOC	08-001(a)	Off-gas system	Pre-Investigation		Pajarito Watershed
308	AOC	08-001(b)	Off-gas system	Pre-Investigation		Pajarito Watershed
309	SWMU	08-002	Firing site	Pre-Investigation		Pajarito Watershed
310	SWMU	08-003(a)	Former septic tank	Pre-Investigation		Pajarito Watershed
311	SWMU	08-004(a)	Floor drain	Pre-Investigation		Pajarito Watershed
312	SWMU	08-004(b)	Drainline	Pre-Investigation		Pajarito Watershed
313	SWMU	08-004(c)	Floor drain and sumps	Pre-Investigation		Pajarito Watershed
314	SWMU	08-004(d)	Drain	Pre-Investigation		Pajarito Watershed
315	SWMU	08-005	Former storage vessel	Pre-Investigation		Pajarito Watershed
316	SWMU	08-006(a)	Material disposal area (MDA) Q	Pre-Investigation		Pajarito Watershed
317	SWMU	08-009(a)	Drainline and outfall	Pre-Investigation		Pajarito Watershed
318	AOC	08-009(c)	Storm drain and outfall from Building 8-23	Pre-Investigation		Pajarito Watershed
319	SWMU	08-009(d)	Drains	Pre-Investigation		Pajarito Watershed
320	SWMU	08-009(e)	Outfall from Building 8-21	Pre-Investigation		Pajarito Watershed
321	AOC	08-009(f)	Outfall associated with Building 8-22	Pre-Investigation		Pajarito Watershed
322	AOC	C-08-014	Laboratory and Administrative Building 8-21	Pre-Investigation		Pajarito Watershed
323	SWMU	09-001(a)	Soil contamination from firing site and former firing site structure 9-04	Pre-Investigation		Pajarito Watershed

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
324	SWMU	09-001(b)	Firing Site	Pre-Investigation		Pajarito Watershed
325	SWMU	09-001(c)	Firing site	Pre-Investigation		Pajarito Watershed
326	SWMU	09-001(d)	Firing site	Pre-Investigation		Pajarito Watershed
327	SWMU	09-002	Burn pit	Pre-Investigation		Pajarito Watershed
328	SWMU	09-003(a)	Soil contamination associate with former settling tank	Pre-Investigation		Pajarito Watershed
329	SWMU	09-003(b)	Soil contamination associate with former settling tank	Pre-Investigation		Pajarito Watershed
330	SWMU	09-003(d)	Soil contamination associate with former settling tank	Pre-Investigation		Pajarito Watershed
331	SWMU	09-003(e)	Soil contamination associated with former Basket Pit	Pre-Investigation		Pajarito Watershed
332	SWMU	09-003(g)	Soil contamination associated with former Sump and pipes	Pre-Investigation		Pajarito Watershed
333	SWMU	09-003(h)	Soil contamination associated with former Sump and pipes	Pre-Investigation		Pajarito Watershed
334	SWMU	09-003(i)	Soil Contamination associated with former Sump and Pipes	Pre-Investigation		Pajarito Watershed
335	SWMU	09-004(a)	Settling tank	Pre-Investigation		Pajarito Watershed
336	SWMU	09-004(b)	Settling tank	Pre-Investigation		Pajarito Watershed
337	SWMU	09-004(c)	Settling tank	Pre-Investigation		Pajarito Watershed
338	SWMU	09-004(d)	Settling tank	Pre-Investigation		Pajarito Watershed
339	SWMU	09-004(e)	Settling tank	Pre-Investigation		Pajarito Watershed
340	SWMU	09-004(f)	Settling tank	Pre-Investigation		Pajarito Watershed
341	SWMU	09-004(g)	Settling tank	Pre-Investigation		Pajarito Watershed
342	SWMU	09-004(h)	Settling tank	Pre-Investigation		Pajarito Watershed
343	SWMU	09-004(i)	Settling tank	Pre-Investigation		Pajarito Watershed
344	SWMU	09-004(j)	Settling tank	Pre-Investigation		Pajarito Watershed
345	SWMU	09-004(k)	Settling tank	Pre-Investigation		Pajarito Watershed
346	SWMU	09-004(l)	Settling tank	Pre-Investigation		Pajarito Watershed
347	SWMU	09-004(m)	Settling tank	Pre-Investigation		Pajarito Watershed
348	SWMU	09-004(n)	Settling tank	Pre-Investigation		Pajarito Watershed
349	SWMU	09-004(o)	Settling tank	Pre-Investigation		Pajarito Watershed
350	SWMU	09-005(a)	Soil contamination from former septic tank	Pre-Investigation		Pajarito Watershed
351	SWMU	09-005(d)	Septic Tank	Pre-Investigation		Pajarito Watershed
352	SWMU	09-005(g)	Settling Tank	Pre-Investigation		Pajarito Watershed
353	SWMU	09-006	Soil contamination associated with former septic tank	Pre-Investigation		Pajarito Watershed
354	SWMU	09-008(b)	Oxidation Pond	Pre-Investigation		Pajarito Watershed
355	SWMU	09-009	Surface impoundment	Pre-Investigation		Pajarito Watershed
356	AOC	09-010(a)	Storage Area	Pre-Investigation		Pajarito Watershed
357	AOC	09-010(b)	Storage Area	Pre-Investigation		Pajarito Watershed
358	AOC	09-011(b)	Storage area	Pre-Investigation		Pajarito Watershed
359	AOC	09-011(c)	Storage area	Pre-Investigation		Pajarito Watershed
360	AOC	09-012	Disposal Pit	Pre-Investigation		Pajarito Watershed
361	SWMU	09-013	Material Disposal Area (MDA) M	Pre-Investigation		Pajarito Watershed
362	AOC	09-014	Soil contamination associated with former Camera Mount	Pre-Investigation		Pajarito Watershed
363	SWMU	C-09-001	Soil contamination associated with outfall	Pre-Investigation		Pajarito Watershed
364	SWMU	10-001(a)	Firing site	Request for CoC Submitted to NMED		
365	SWMU	10-001(b)	Firing site	Request for CoC Submitted to NMED		
366	SWMU	10-001(c)	Firing site	Request for CoC Submitted to NMED		
367	SWMU	10-001(d)	Firing site	Request for CoC Submitted to NMED		
368	SWMU	10-002(a)	Disposal Pit	Request for CoC Submitted to NMED		
369	SWMU	10-002(b)	Disposal Pit	Request for CoC Submitted to NMED		
370	SWMU	10-003(a)	Soil contamination from former disposal pit	Request for CoC Submitted to NMED		

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
371	SWMU	10-003(b)	Soil contamination from former disposal pit	Request for CoC Submitted to NMED		
372	SWMU	10-003(c)	Soil contamination from former disposal pit	Request for CoC Submitted to NMED		
373	SWMU	10-003(d)	Soil contamination from former disposal pit	Request for CoC Submitted to NMED		
374	SWMU	10-003(e)	Soil contamination from disposal pit	Request for CoC Submitted to NMED		
375	SWMU	10-003(f)	Soil contamination from former disposal pit	Request for CoC Submitted to NMED		
376	SWMU	10-003(g)	Soil contamination from former manhole	Request for CoC Submitted to NMED		
377	SWMU	10-003(h)	Soil contamination from former manhole	Request for CoC Submitted to NMED		
378	SWMU	10-003(i)	Soil contamination from former septic tank	Request for CoC Submitted to NMED		
379	SWMU	10-003(j)	Soil contamination from former tank	Request for CoC Submitted to NMED		
380	SWMU	10-003(k)	Soil contamination from former tank	Request for CoC Submitted to NMED		
381	SWMU	10-003(l)	Soil contamination from former tank	Request for CoC Submitted to NMED		
382	SWMU	10-003(m)	Soil contamination from former waste line	Request for CoC Submitted to NMED		
383	SWMU	10-003(n)	Soil contamination from former leach field	Request for CoC Submitted to NMED		
384	SWMU	10-003(o)	Soil contamination from Decontamination Holes associated with former leach field	Request for CoC Submitted to NMED		
385	SWMU	10-004(a)	Soil contamination from former septic tank	Request for CoC Submitted to NMED		
386	SWMU	10-004(b)	Septic System	Request for CoC Submitted to NMED		
387	SWMU	10-005	Surface disposal	Request for CoC Submitted to NMED		
388	SWMU	10-006	Burn site	Request for CoC Submitted to NMED		
389	SWMU	10-007	Landfill	Request for CoC Submitted to NMED		
390	SWMU	10-008	Tree-rimmed firing point, Bayo Canyon	Request for CoC Submitted to NMED		
391	SWMU	10-009	Former Bayo Canyon Landfill-	Request for CoC Submitted to NMED		
392	AOC	C-10-001	Contaminated soil, Bayo Canyon	Request for CoC Submitted to NMED		
393	SWMU	11-001(a)	Firing site	Deferred Site		
394	SWMU	11-001(b)	Firing site	Deferred Site		
395	SWMU	11-001(c)	Firing site	Pre-Investigation		Upper Water Watershed
396	SWMU	11-002	Burn Site	Deferred Site		
397	AOC	11-003(b)	Air Gun	Deferred Site		
398	SWMU	11-004(a)	Drop tower	Deferred Site		
399	SWMU	11-004(b)	Concrete Pad	Deferred Site		
400	SWMU	11-004(c)	Hoist	Deferred Site		
401	SWMU	11-004(d)	Hoist	Deferred Site		
402	SWMU	11-004(e)	Drop Pad	Deferred Site		
403	AOC	11-004(f)	Drop Pad	Deferred Site		
404	SWMU	11-005(a)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
405	SWMU	11-005(b)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
406	SWMU	11-005(c)	Outfall from former Building 11-2	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
407	SWMU	11-006(a)	Sump	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
408	SWMU	11-006(b)	Catch Basin System	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
409	SWMU	11-006(c)	Catch Basin System	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
410	SWMU	11-006(d)	Catch Basin System	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
411	SWMU	11-009	Material disposal area (MDA) S	Deferred Site		
412	SWMU	11-011(a)	Outfall from Building 11-30	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
413	SWMU	11-011(b)	Outfall from Building 11-30A	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
414	SWMU	11-011(d)	Outfall from Building 11-24	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
415	AOC	11-012(a)	Soil contamination associated with former Structure 11-7	Pre-Investigation		Upper Water Watershed
416	AOC	11-012(b)	Soil contamination associated with former Structure 11-8	Pre-Investigation		Upper Water Watershed

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
417	AOC	11-012(c)	Soil contamination associated with former Structure 11-9	Deferred Site		
418	AOC	11-012(d)	Soil contamination associated with former Structure 11-10	Deferred Site		
419	AOC	C-11-001	Soil contamination associated with former Structure 11-5	Deferred Site		
420	AOC	C-11-002	Soil contamination associated with former Structure 11-12	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
421	SWMU	12-001(a)	Firing site Steel-lined container	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
422	SWMU	12-001(b)	Firing site	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
423	SWMU	12-002	Burn Site	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
424	AOC	12-004(a)	Radiation test facility	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
425	AOC	12-004(b)	Pipe	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
426	AOC	C-12-001	Soil contamination associated with former Trim Building 12-1	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
427	AOC	C-12-002	Soil contamination associated with former Control Building 12-2	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
428	AOC	C-12-003	Soil contamination associated with former Storage Building 12-3	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
429	AOC	C-12-004	Soil contamination associated with former Generator Building 12-5	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
430	AOC	C-12-005	Soil contamination associated with former Junction box 12-6	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
431	SWMU	13-001	Firing site	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
432	SWMU	13-002	Landfill	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
433	SWMU	13-003(a)	Soil contamination from a former septic tank	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
434	AOC	13-003(b)	Drain field	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
435	SWMU	13-004	Disposal pit - existence not determined	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
436	AOC	14-001(a)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
437	AOC	14-001(b)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
438	AOC	14-001(c)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
439	AOC	14-001(d)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
440	AOC	14-001(e)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
441	AOC	14-001(f)	Firing site	Deferred Site		
442	AOC	14-001(g)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
443	SWMU	14-002(a)	Firing site	Deferred Site		
444	SWMU	14-002(b)	Firing site	Deferred Site		
445	SWMU	14-002(c)	Control Building 14-5	Deferred Site		
446	SWMU	14-002(d)	Firing site	Deferred Site		
447	SWMU	14-002(e)	Firing site	Deferred Site		
448	SWMU	14-002(f)	Soil contamination associated with former Junction Box 14-12	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
449	SWMU	14-003	Open burning ground	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
450	AOC	14-004(a)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
451	SWMU	14-005	Burn Cage for OB/OD unit TA-14-23	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
452	SWMU	14-006	Sump and/or associated equipment	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
453	SWMU	14-007	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
454	SWMU	14-009	Surface Disposal Site	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
455	SWMU	14-010	Soil contamination from former Sump and Drain lines	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
456	AOC	C-14-001	Soil contamination associated with former Magazine 14-1	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
457	AOC	C-14-002	Soil contamination associate with former Building 14-3	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
458	AOC	C-14-003	Soil contamination associated with former Structure 14-4	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
459	AOC	C-14-004	Soil contamination associated with former Electronics Shop 14-7	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
460	AOC	C-14-005	Soil contamination associated with former Storage Building 14-8	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
461	AOC	C-14-006	Soil contamination associated with former Magazine 14-9	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
462	AOC	C-14-007	Soil contamination associated with former Storage Building 14-10	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
463	AOC	C-14-008	Soil contamination associated with former Magazine 14-11	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
464	AOC	C-14-009	Soil contamination associated with former Magazine 14-13	RFI or Field Work in Progress (IM, ACA)		SIR - CdV TA-14
465	AOC	15-001	Surface disposal Site	Pre-Investigation		Southern External Boundary
466	SWMU	15-002	Burn Site	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
467	SWMU	15-003	Phermex Firing Site (TA-15-184)	Deferred Site		
468	SWMU	15-004(a)	Firing Site C	Deferred Site		
469	SWMU	15-004(b)	Firing Site A	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
470	SWMU	15-004(c)	Firing Site B	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
471	AOC	15-004(d)	Firing site C	Deferred Site		
472	SWMU	15-004(f)	Firing site E-F	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
473	SWMU	15-004(g)	Firing site G	Deferred Site		
474	AOC	15-004(h)	Firing site H	Pre-Investigation		Southern External Boundary
475	SWMU	15-004(i)	The Gulch firing site	Pre-Investigation		Upper Water Watershed
476	AOC	15-005(b)	Container storage area	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
477	AOC	15-005(c)	Container storage area (R-41)	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
478	SWMU	15-006(a)	Phermex Firing Site (TA-15-184)	Deferred Site		
479	SWMU	15-006(b)	Firing Site Ector	Deferred Site		
480	SWMU	15-006(c)	Firing site (R-44)	Deferred Site		
481	SWMU	15-006(d)	Firing site (R-45)	Deferred Site		
482	AOC	15-006(e)	I-J Firing Site at TA-36	CoC without Controls	5/30/2013	
483	SWMU	15-007(a)	Material Disposal Area (MDA) N	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
484	SWMU	15-007(b)	Material Disposal Area (MDA) Z	Pre-Investigation		Upper Water Watershed
485	SWMU	15-007(c)	Shaft	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
486	SWMU	15-007(d)	Shaft	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
487	SWMU	15-008(a)	Surface Disposal Site (E-F Site)	RFI or Field Work in Progress (IM, ACA)		SIR - Potrillo/Fence
488	SWMU	15-008(b)	Surface Disposal Site	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
489	SWMU	15-008(c)	Surface Disposal Site	Pre-Investigation		Upper Water Watershed
490	SWMU	15-008(d)	Surface Disposal Site	Pre-Investigation		Upper Water Watershed
491	AOC	15-008(f)	I-J Firing site mounds at TA-36	Deferred Site		
492	AOC	15-008(g)	Surface Disposal Site	RFI or Field Work in Progress (IM, ACA)		SIR - Threemile
493	SWMU	15-009(a)	Former structures - the Hollow	Pre-Investigation		Upper Water Watershed
494	SWMU	15-009(b)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - Threemile
495	SWMU	15-009(c)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
496	SWMU	15-009(e)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
497	SWMU	15-009(f)	Firing site septic system	Pre-Investigation		Upper Water Watershed
498	SWMU	15-009(g)	Septic system	Pre-Investigation		Southern External Boundary
499	SWMU	15-009(h)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
500	SWMU	15-009(i)	Septic system	Pre-Investigation		Upper Water Watershed
501	SWMU	15-009(k)	Firing site septic system (renumbered from 15-009(l))	Pre-Investigation		Upper Water Watershed
502	SWMU	15-010(a)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
503	SWMU	15-010(b)	Septic system	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
504	SWMU	15-011(a)	Concrete Trench Drains	Pre-Investigation		Upper Water Watershed
505	SWMU	15-011(b)	Drainage channel	Pre-Investigation		Upper Water Watershed
506	SWMU	15-011(c)	Outfall	Pre-Investigation		Upper Water Watershed
507	SWMU	15-014(a)	Outfalls from Building 15-183	Pre-Investigation		Upper Water Watershed
508	SWMU	15-014(b)	Outfalls from Building 15-183	Pre-Investigation		Upper Water Watershed
509	AOC	15-014(d)	Drainage	Pre-Investigation		Southern External Boundary
510	AOC	15-014(g)	Outfall from Building 15-203	Pre-Investigation		Upper Water Watershed

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
511	AOC	15-014(h)	Outfalls from Building 15-40	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
512	SWMU	15-014(i)	Outfall from former Building 15-194 (renumbered from 15-012(f))	Pre-Investigation		Upper Water Watershed
513	SWMU	15-014(j)	Outfalls from former Building 15-50 (renumbered from 15-012(g))	Pre-Investigation		Upper Water Watershed
514	SWMU	15-014(k)	Outfalls from former Building 15-20 (renumbered from 15-012(d))	Pre-Investigation		Upper Water Watershed
515	SWMU	15-014(l)	Outfalls from former Building 15-202 (renumbered from 15-012(c))	Pre-Investigation		Southern External Boundary
516	AOC	C-15-001	Contaminated soil near Firing Site	Pre-Investigation		Upper Water Watershed
517	AOC	C-15-004	Former Transformer Station	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
518	AOC	C-15-005	Soil contamination associate with former laboratory and building	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
519	AOC	C-15-006	Soil contamination associate with former Building 15-7	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
520	AOC	C-15-007	Non-intentional release area	Pre-Investigation		Upper Water Watershed
521	AOC	C-15-010	Former underground tank	Pre-Investigation		Upper Water Watershed
522	AOC	C-15-011	Former underground tank	Pre-Investigation		Southern External Boundary
523	SWMU	16-001(a)	Tank	Pre-Investigation		Upper Water Watershed
524	SWMU	16-001(b)	Dry Wells	Pre-Investigation		Upper Water Watershed
525	SWMU	16-001(c)	Tank	Pre-Investigation		Upper Water Watershed
526	SWMU	16-001(d)	Dry well	Pre-Investigation		Upper Water Watershed
527	SWMU	16-001(e)	Dry Well	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
528	SWMU	16-003(a)	Sump	Pre-Investigation		Upper Water Watershed
529	SWMU	16-003(b)	Sump	Pre-Investigation		Upper Water Watershed
530	SWMU	16-003(c)	Sump	Pre-Investigation		Upper Water Watershed
531	SWMU	16-003(d)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
532	SWMU	16-003(e)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
533	SWMU	16-003(f)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
534	SWMU	16-003(g)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
535	SWMU	16-003(h)	Sump	Pre-Investigation		Upper Water Watershed
536	SWMU	16-003(i)	Sump	Pre-Investigation		Upper Water Watershed
537	SWMU	16-003(j)	Sump	Pre-Investigation		Upper Water Watershed
538	SWMU	16-003(k)	Sumps	CME in Progress		RDX Characterization
539	SWMU	16-003(l)	Sumps	Pre-Investigation		Upper Water Watershed
540	SWMU	16-003(m)	Sump	Pre-Investigation		Upper Water Watershed
541	SWMU	16-003(n)	Sump	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
542	SWMU	16-003(o)	Sumps	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
543	AOC	16-003(p)	Sump	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
544	AOC	16-003(q)	Sump	Pre-Investigation		Upper Water Watershed
545	SWMU	16-004(a)	Imhoff Tank	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
546	SWMU	16-004(b)	Trickling Filter	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
547	SWMU	16-004(c)	Tank	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
548	SWMU	16-004(d)	Sludge Drying Bed	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
549	SWMU	16-004(e)	Screen	CoC without Controls	7/2/2012	
550	SWMU	16-004(f)	Sludge Drying Bed	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
551	SWMU	16-005(a)	Septic tank	Pre-Investigation		Upper Water Watershed
552	SWMU	16-005(c)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
553	SWMU	16-005(d)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
554	SWMU	16-005(e)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
555	SWMU	16-005(g)	Soil contamination from former Filter Bed	Pre-Investigation		Upper Water Watershed
556	SWMU	16-005(h)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed

Appendix A  
Solid Waste Management Unit/Area of Concern List

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
557	SWMU	16-005(j)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
558	SWMU	16-005(k)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
559	SWMU	16-005(l)	Grease trap	Pre-Investigation		Upper Water Watershed
560	SWMU	16-005(m)	Soil contamination from former Sump	Pre-Investigation		Upper Water Watershed
561	SWMU	16-005(n)	Soil contamination from former septic tank	Pre-Investigation		Upper Water Watershed
562	SWMU	16-006(a)	Septic Tank	Pre-Investigation		Upper Water Watershed
563	SWMU	16-006(c)	Septic Tank	Pre-Investigation		Upper Water Watershed
564	SWMU	16-006(d)	Septic Tank	Pre-Investigation		Upper Water Watershed
565	SWMU	16-006(e)	Former Septic Tank	CoC without Controls	1/10/2006	
566	SWMU	16-006(g)	Septic Tank	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
567	SWMU	16-006(h)	Pump Pit	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
568	SWMU	16-007(a)	Settling Ponds	Request for CoC Submitted to NMED		
569	SWMU	16-008(a)	Settling Pond	Request for CoC Submitted to NMED		
570	SWMU	16-009(a)	Former Burn site	Pre-Investigation		Upper Water Watershed
571	SWMU	16-010(a)	Burn Site	CoC without Controls	1/10/2006	
572	SWMU	16-010(h)	Former Basket-Wash facility	Pre-Investigation		Upper Water Watershed
573	SWMU	16-010(i)	Burn Pad	Pre-Investigation		Upper Water Watershed
574	SWMU	16-010(k)	Former trough	Pre-Investigation		Upper Water Watershed
575	SWMU	16-010(l)	Former trough	Pre-Investigation		Upper Water Watershed
576	SWMU	16-010(m)	Former trough	Pre-Investigation		Upper Water Watershed
577	SWMU	16-010(n)	Former trough	Pre-Investigation		Upper Water Watershed
578	AOC	16-011	Former Incinerator	Pre-Investigation		Upper Water Watershed
579	SWMU	16-013	Container Storage Area	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
580	SWMU	16-015(a)	Soil contamination from former Men's locker room and laundry facility	Pre-Investigation		Upper Water Watershed
581	SWMU	16-015(b)	Soil contamination associated with former Steam-washing facility	Pre-Investigation		Upper Water Watershed
582	AOC	16-015(c)	Soil contamination from former Building 16-36	Pre-Investigation		Upper Water Watershed
583	AOC	16-015(d)	Soil contamination from former steam-cleaning Building 16-51	Pre-Investigation		Upper Water Watershed
584	SWMU	16-016(a)	Landfill - buried metal site	Pre-Investigation		Upper Water Watershed
585	SWMU	16-016(b)	Surface Disposal Site	Pre-Investigation		Upper Water Watershed
586	SWMU	16-016(c)	Soil contamination from former Barium Nitrate Storage Area/Pile	CoC without Controls	1/10/2006	
587	SWMU	16-016(d)	Surface disposal site	Pre-Investigation		Upper Water Watershed
588	SWMU	16-016(e)	Surface disposal site	Pre-Investigation		Upper Water Watershed
589	AOC	16-016(f)	Surface Disposal Site	Pre-Investigation		Upper Water Watershed
590	SWMU	16-016(g)	Surface disposal site	Pre-Investigation		Upper Water Watershed
591	SWMU	16-017(a)-99	Soil contamination from former HE Machining Building 16-92	Request for CoC Submitted to NMED		
592	SWMU	16-017(b)-99	Soil contamination from former HE Machining Building 16-93	Request for CoC Submitted to NMED		
593	SWMU	16-017(c)-99	Soil contamination from former HE Machining Building 16-91	Request for CoC Submitted to NMED		
594	SWMU	16-017(d)-99	Soil contamination from former HE Machining Building 16-90	Request for CoC Submitted to NMED		
595	SWMU	16-017(e)-99	Soil contamination from former HE Machining Building 16-89	Request for CoC Submitted to NMED		
596	SWMU	16-017(f)-99	Soil contamination from former HE Machining Building 16-99	Pre-Investigation		Upper Water Watershed
597	SWMU	16-017(g)-99	Former storage magazine	Pre-Investigation		Upper Water Watershed
598	SWMU	16-017(h)-99	Soil contamination from former HE Casting Building 16-27	Pre-Investigation		Upper Water Watershed
599	SWMU	16-017(i)-99	Former storage building	Pre-Investigation		Upper Water Watershed
600	SWMU	16-017(j)-99	Former storage magazine 16-63	Pre-Investigation		Upper Water Watershed
601	SWMU	16-017(k)-99	Former storage magazine 16-78	Pre-Investigation		Upper Water Watershed
602	SWMU	16-017(l)-99	Former storage magazine 16-77	Pre-Investigation		Upper Water Watershed

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
603	SWMU	16-017(m)-99	Former storage magazine 16-76	Pre-Investigation		Upper Water Watershed
604	SWMU	16-017(n)-99	Former storage magazine 16-75	Pre-Investigation		Upper Water Watershed
605	SWMU	16-017(o)-99	Former storage magazine 16-59	Pre-Investigation		Upper Water Watershed
606	SWMU	16-017(p)-99	Former storage magazine 16-61	CoC without Controls	7/2/2012	
607	SWMU	16-017(q)-99	Storage Magazine	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
608	SWMU	16-017(r)-99	Former Assembly Site/Storage Building 16-520	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
609	SWMU	16-017(s)-99	Former Assembly Site/Storage Building 16-519	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
610	SWMU	16-017(t)-99	Former Assembly Site/Storage Building 16-516	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
611	SWMU	16-017(u)-99	Soil contamination from former Storage and Support Structure 16-164	Pre-Investigation		Upper Water Watershed
612	SWMU	16-017(v)-99	Soil contamination from former HE Processing Building	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
613	SWMU	16-017(w)-99	Former Storage Magazine 16-73	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
614	SWMU	16-017(x)-99	Soil Contamination from former Storage Magazine 16-79	Pre-Investigation		Upper Water Watershed
615	SWMU	16-019	Material disposal area (MDA) R (includes SWMU 16-009(b))	Pre-Investigation		Upper Water Watershed
616	SWMU	16-020	Outfall from former 16-222	Pre-Investigation		Upper Water Watershed
617	SWMU	16-021(a)	Operational release associated with Building 16-150	Pre-Investigation		Upper Water Watershed
618	AOC	16-021(b)	Operational Release	Pre-Investigation		Upper Water Watershed
619	SWMU	16-021(c)	Outfall associated with Building 16-260	CNE in Progress		RDX Characterization
620	AOC	16-022(a)	Former Underground Storage Tank	Pre-Investigation		Upper Water Watershed
621	AOC	16-022(b)	Former Underground Storage Tank	Pre-Investigation		Upper Water Watershed
622	AOC	16-023(a)	Soil contamination from former Incinerator	Pre-Investigation		Upper Water Watershed
623	AOC	16-024(a)	Soil contamination from former Magazine 16-488	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
624	AOC	16-024(b)	Soil contamination from former Magazine 16-74	Pre-Investigation		Upper Water Watershed
625	AOC	16-024(c)	Soil contamination from former Magazine 16-30	Pre-Investigation		Upper Water Watershed
626	AOC	16-024(d)	Soil contamination from former Magazine 16-34	Request for CoC Submitted to NMED		
627	SWMU	16-024(e)	Soil contamination from former Magazine 16-33	Request for CoC Submitted to NMED		
628	AOC	16-024(f)	Soil contamination from former Magazine 16-493	Pre-Investigation		Upper Water Watershed
629	AOC	16-024(g)	Soil contamination from former Magazine 16-494	Pre-Investigation		Upper Water Watershed
630	AOC	16-024(h)	Soil contamination from former Magazine 16-497	Pre-Investigation		Upper Water Watershed
631	AOC	16-024(i)	Soil contamination from former Magazine 16-64	Pre-Investigation		Upper Water Watershed
632	AOC	16-024(j)	Soil contamination from former Magazine 16-65	Pre-Investigation		Upper Water Watershed
633	AOC	16-024(k)	Soil contamination from former Magazine 16-57	Pre-Investigation		Upper Water Watershed
634	AOC	16-024(l)	Soil contamination from former Magazine 16-72	Pre-Investigation		Upper Water Watershed
635	AOC	16-024(m)	Soil contamination from former Magazine 16-66	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
636	AOC	16-024(n)	Soil contamination from former Magazine 16-84	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
637	AOC	16-024(o)	Soil contamination from former Magazine 16-67	Pre-Investigation		Upper Water Watershed
638	AOC	16-024(p)	Soil contamination from former Magazine 16-70	Pre-Investigation		Upper Water Watershed
639	AOC	16-024(q)	Soil contamination from former Magazine 16-71	Pre-Investigation		Upper Water Watershed
640	AOC	16-024(r)	Soil contamination from former Magazine 16-68	Pre-Investigation		Upper Water Watershed
641	AOC	16-024(s)	Soil contamination from former Magazine 16-60	Pre-Investigation		Upper Water Watershed
642	AOC	16-024(t)	Soil contamination from former Magazine 16-464	Pre-Investigation		Upper Water Watershed
643	AOC	16-024(u)	Soil contamination from former Magazine 16-481	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
644	AOC	16-024(v)	Soil contamination from former Magazine 16-62	CoC without Controls	6/29/2007	
645	SWMU	16-025(a)	Soil contamination from former Radiography Building 16-39	Pre-Investigation		Upper Water Watershed
646	SWMU	16-025(a2)	Soil contamination from former HE casting Building 16-50	Pre-Investigation		Upper Water Watershed
647	SWMU	16-025(b)	Soil contamination from former Radiography Building 16-40	Pre-Investigation		Upper Water Watershed
648	SWMU	16-025(b2)	Soil contamination from former HE casting Building 16-52	Pre-Investigation		Upper Water Watershed

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
649	SWMU	16-025(c2)	Soil contamination from former Building 16-56	Pre-Investigation		Upper Water Watershed
650	SWMU	16-025(d)	Soil contamination from former Equipment and Control Building 16-94	Pre-Investigation		Upper Water Watershed
651	SWMU	16-025(d2)	Soil contamination from former Structure 16-480	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
652	SWMU	16-025(e)	Soil contamination from former HE Machining building 16-31	Request for CoC Submitted to NMED		
653	SWMU	16-025(f)	Soil contamination from former HE Machining building 16-32	Request for CoC Submitted to NMED		
654	SWMU	16-025(g)	Soil contamination from former HE machining Building 16-95	Pre-Investigation		Upper Water Watershed
655	SWMU	16-025(h)	Soil contamination from former HE Machining Building 16-96	Pre-Investigation		Upper Water Watershed
656	SWMU	16-025(i)	Soil contamination from former HE Machining Building 16-97	Pre-Investigation		Upper Water Watershed
657	SWMU	16-025(j)	Soil contamination from former HE Machining Building 16-98	Pre-Investigation		Upper Water Watershed
658	SWMU	16-025(k)	Soil contamination from former HE Powder Inspection Building 16-25	Pre-Investigation		Upper Water Watershed
659	SWMU	16-025(l)	Soil contamination from former HE Casting Building 16-26	Pre-Investigation		Upper Water Watershed
660	SWMU	16-025(m)	Soil contamination from former X-ray hutment 16-495	Pre-Investigation		Upper Water Watershed
661	SWMU	16-025(n)	Soil contamination from former X-ray hutment 16-499	Pre-Investigation		Upper Water Watershed
662	SWMU	16-025(o)	Soil contamination from former X-ray hutment 16-500	Pre-Investigation		Upper Water Watershed
663	SWMU	16-025(p)	Soil contamination from former HE processing Building 16-44	Pre-Investigation		Upper Water Watershed
664	SWMU	16-025(q)	Soil contamination from former HE processing Building 16-45	Pre-Investigation		Upper Water Watershed
665	SWMU	16-025(r)	Soil contamination from former Rest House 16-46	Pre-Investigation		Upper Water Watershed
666	SWMU	16-025(s)	Soil contamination from former Radium Source Building 16-48	Pre-Investigation		Upper Water Watershed
667	SWMU	16-025(t)	Soil contamination from former HE equipment casting Building 16-38	Pre-Investigation		Upper Water Watershed
668	SWMU	16-025(u)	Soil contamination from former HE processing Building 16-42	Pre-Investigation		Upper Water Watershed
669	SWMU	16-025(v)	Soil contamination from former HE processing Building 16-81	Pre-Investigation		Upper Water Watershed
670	SWMU	16-025(w)	Soil contamination from former Building 16-81	Pre-Investigation		Upper Water Watershed
671	SWMU	16-025(x)	Soil contamination from former Electroplating Laboratory 16-100	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
672	SWMU	16-025(y)	Soil contamination from former HE grinding facility 16-55	Pre-Investigation		Upper Water Watershed
673	SWMU	16-025(z)	Soil contamination from former HE explosives Testing Building 16-37	Pre-Investigation		Upper Water Watershed
674	SWMU	16-026(a)	Outfall from Building 16-370	Pre-Investigation		Upper Water Watershed
675	SWMU	16-026(b)	Outfall from Structure 16-307	Pre-Investigation		Known Cleanup Sites (Above SSLs)
676	SWMU	16-026(b2)	Outfall from Building 16-202	Pre-Investigation		Upper Water Watershed
677	SWMU	16-026(c)	Outfall from Building 16-305 Drain	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
678	SWMU	16-026(c2)	Outfall from Building 16-462	Pre-Investigation		Upper Water Watershed
679	SWMU	16-026(d)	Outfall from Building 16-303	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
680	SWMU	16-026(e)	Outfall from Structure 16-301	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
681	SWMU	16-026(f)	Outfall from Building 16-308	CoC without Controls	1/23/2008	
682	SWMU	16-026(g)	Outfall from Structure 16-280	Pre-Investigation		Upper Water Watershed
683	SWMU	16-026(h2)	Outfall associated with Building 16-360	Pre-Investigation		Upper Water Watershed
684	SWMU	16-026(i)	Outfall from former Building 16-224	Pre-Investigation		Upper Water Watershed
685	SWMU	16-026(j)	Outfall from former Building 16-226	Pre-Investigation		Upper Water Watershed
686	SWMU	16-026(j2)	Outfall from former Building 16-345	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
687	SWMU	16-026(k2)	Outfall from former Building 16-260	Pre-Investigation		Upper Water Watershed
688	SWMU	16-026(l)	Outfalls associated with former Building 16-220	Pre-Investigation		Upper Water Watershed
689	SWMU	16-026(m)	Outfall associated with former Building 16-92	Request for CoC Submitted to NMED		
690	SWMU	16-026(n)	Outfall associated with former Building 16-91	Request for CoC Submitted to NMED		
691	SWMU	16-026(o)	Outfall associated with former Building 16-90	Request for CoC Submitted to NMED		

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
692	SWMU	16-026(p)	Outfall associated with former Building 16-89	Request for CoC Submitted to NMED		
693	SWMU	16-026(q)	Outfall from former Building 16-27	Pre-Investigation		Upper Water Watershed
694	SWMU	16-026(r)	Outfall from Building 16-180 Drain	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
695	SWMU	16-026(s)	Outfall from Building 16-5	Pre-Investigation		Upper Water Watershed
696	SWMU	16-026(u)	Outfall from former Building 16-195 Drain	Pre-Investigation		Upper Water Watershed
697	SWMU	16-026(v)	Outfall from Building 16-460	Pre-Investigation		Upper Water Watershed
698	SWMU	16-026(w)	Outfall from former Building 16-45	Pre-Investigation		Upper Water Watershed
699	SWMU	16-026(y)	Outfall from Building 16-411	Pre-Investigation		Upper Water Watershed
700	SWMU	16-026(z)	Outfall from Building 16-306	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
701	AOC	16-027(a)	Transformer	Pre-Investigation		Upper Water Watershed
702	AOC	16-027(b)	Transformer	Pre-Investigation		Upper Water Watershed
703	AOC	16-027(c)	Transformer	Pre-Investigation		Upper Water Watershed
704	AOC	16-027(d)	Transformer	Pre-Investigation		Upper Water Watershed
705	SWMU	16-028(a)	Drainage Channel	Pre-Investigation		Upper Water Watershed
706	SWMU	16-028(b)	Outfall from Building 16-370	Pre-Investigation		Upper Water Watershed
707	SWMU	16-028(c)	Outfall from former Building 16-220	Pre-Investigation		Upper Water Watershed
708	SWMU	16-028(d)	Outfall from former Building 16-202	Pre-Investigation		Upper Water Watershed
709	SWMU	16-028(e)	Outfall associated with Building 16-450	Pre-Investigation		Upper Water Watershed
710	SWMU	16-029(a)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
711	SWMU	16-029(a2)	Sump	Pre-Investigation		Upper Water Watershed
712	SWMU	16-029(b)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
713	SWMU	16-029(b2)	Sump	Pre-Investigation		Upper Water Watershed
714	SWMU	16-029(c)	Sumps	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
715	SWMU	16-029(c2)	Sumps	Pre-Investigation		Upper Water Watershed
716	SWMU	16-029(d)	Sumps	CoC without Controls	7/2/2012	
717	SWMU	16-029(d2)	Sumps	Pre-Investigation		Upper Water Watershed
718	SWMU	16-029(e)	Sump	Pre-Investigation		Upper Water Watershed
719	SWMU	16-029(e2)	Sumps	Pre-Investigation		Upper Water Watershed
720	SWMU	16-029(f)	Sump	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
721	SWMU	16-029(f2)	Soil contamination from former Sump and Outfall from former Building 16-24	Pre-Investigation		Upper Water Watershed
722	SWMU	16-029(g)	Former Sump	Pre-Investigation		Upper Water Watershed
723	SWMU	16-029(g2)	Pit	CoC without Controls	7/2/2012	
724	SWMU	16-029(h)	Outfall from former Building 16-478	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
725	SWMU	16-029(h2)	Soil contamination from former manhole associated with former Buildings 16-95, -96, -97, -98	Pre-Investigation		Upper Water Watershed
726	SWMU	16-029(i)	Sump	RFI or Field Work Rpt Submitted to NMED		Upper Water Watershed
727	SWMU	16-029(j)	Sump	Pre-Investigation		Upper Water Watershed
728	SWMU	16-029(k)	Sumps	Request for CoC Submitted to NMED		
729	SWMU	16-029(l)	Sumps	Request for CoC Submitted to NMED		
730	SWMU	16-029(m)	Soil contamination from former Sump	Pre-Investigation		Upper Water Watershed
731	SWMU	16-029(n)	Soil contamination from former Sump	Pre-Investigation		Upper Water Watershed
732	SWMU	16-029(o)	Soil contamination from former Sump	Pre-Investigation		Upper Water Watershed
733	SWMU	16-029(p)	Soil contamination from former Sump	Pre-Investigation		Upper Water Watershed
734	SWMU	16-029(q)	Former Sump	Pre-Investigation		Upper Water Watershed
735	SWMU	16-029(r)	Outfall from former Building 16-25	Pre-Investigation		Upper Water Watershed
736	SWMU	16-029(s)	Sumps	Request for CoC Submitted to NMED		

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
737	SWMU	16-029(i)	Sumps	Request for CoC Submitted to NMED		
738	SWMU	16-029(u)	Sumps	Request for CoC Submitted to NMED		
739	SWMU	16-029(v)	Sump	Pre-Investigation		Upper Water Watershed
740	SWMU	16-029(w)	Soil contamination from former Sump	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
741	SWMU	16-029(x)	Sump	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
742	SWMU	16-029(y)	Sump	Pre-Investigation		Upper Water Watershed
743	SWMU	16-029(z)	Sumps	Pre-Investigation		Upper Water Watershed
744	SWMU	16-030(a)	Outfall from former Building 16-344	Pre-Investigation		Upper Water Watershed
745	SWMU	16-030(c)	Outfall from former Building 16-222	CoC without Controls	1/23/2008	
746	AOC	16-030(d)	Outfall from former Building 16-280	Pre-Investigation		Upper Water Watershed
747	AOC	16-030(g)	Outfall from Building 16-380	Pre-Investigation		Upper Water Watershed
748	SWMU	16-030(h)	Outfalls from Building 16-430	Pre-Investigation		Upper Water Watershed
749	SWMU	16-031(a)	Outfall from cooling tower 16-372	Pre-Investigation		Upper Water Watershed
750	SWMU	16-031(b)	Outfall from former cooling tower 16-262	Pre-Investigation		Upper Water Watershed
751	SWMU	16-031(c)	Outfall associated with former Building 16-515	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
752	SWMU	16-031(d)	Outfall from former cooling tower 16-28	Pre-Investigation		Upper Water Watershed
753	SWMU	16-031(e)	Outfall from Building 16-560	Pre-Investigation		Upper Water Watershed
754	SWMU	16-031(f)	Outfall from Building 16-21	CoC without Controls	6/29/2007	
755	SWMU	16-031(h)	Outfall from former Building 16-478	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
756	SWMU	16-032(a)	Sumps	Pre-Investigation		Upper Water Watershed
757	SWMU	16-032(c)	Sumps, drainlines, and outfall from former Building 16-26	Pre-Investigation		Upper Water Watershed
758	AOC	16-033(a)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
759	AOC	16-033(b)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
760	AOC	16-033(c)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
761	AOC	16-033(d)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
762	AOC	16-033(e)	Underground tanks	Pre-Investigation		Upper Water Watershed
763	AOC	16-033(f)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
764	AOC	16-033(g)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
765	AOC	16-033(h)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
766	AOC	16-033(i)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
767	AOC	16-033(j)	Soil contamination from former Underground tank	Pre-Investigation		Upper Water Watershed
768	AOC	16-033(k)	Underground storage tank	Pre-Investigation		Upper Water Watershed
769	SWMU	16-034(a)	Soil contamination from former Laboratory 16-24	Pre-Investigation		Upper Water Watershed
770	SWMU	16-034(b)	Soil contamination from former Building 16-490	Pre-Investigation		Upper Water Watershed
771	SWMU	16-034(c)	Soil contamination from former Storage Hut 16-491	Pre-Investigation		Upper Water Watershed
772	SWMU	16-034(d)	Soil contamination from former Machine Shop 16-492	Pre-Investigation		Upper Water Watershed
773	SWMU	16-034(e)	Soil contamination from former Storage Building 16-496	Pre-Investigation		Upper Water Watershed
774	SWMU	16-034(f)	Soil contamination from former Laboratory 16-498	Pre-Investigation		Upper Water Watershed
775	SWMU	16-034(h)	Soil contamination from former Plumbing and Electrical Shop, 16-137	Pre-Investigation		Upper Water Watershed
776	SWMU	16-034(i)	Soil contamination from former Laboratory 16-141	Pre-Investigation		Upper Water Watershed
777	SWMU	16-034(j)	Soil contamination from former Structure	Pre-Investigation		Upper Water Watershed
778	SWMU	16-034(k)	Soil contamination from former Laboratory 16-140	Pre-Investigation		Upper Water Watershed
779	SWMU	16-034(l)	Soil contamination from former Equipment and Control Building 16-47	Pre-Investigation		Upper Water Watershed
780	SWMU	16-034(m)	Soil contamination from former Laboratory 16-86	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
781	SWMU	16-034(n)	Soil contamination from former Laboratory 16-83	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site

Appendix A  
Solid Waste Management Unit/Area of Concern List

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
782	SWMU	16-034(e)	Soil contamination from former Laboratory 16-49	Pre-Investigation		Upper Water Watershed
783	SWMU	16-034(p)	Soil contamination from former Laboratory 16-41	Pre-Investigation		Upper Water Watershed
784	SWMU	16-035	Soil contamination from former Control Bunker 16-2 (Renumbered)	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
785	SWMU	16-036	Soil contamination from Battleship Bunkers 16-477 and -478	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
786	AOC	16-037	Aboveground Tank - Existence not verified	Pre-Investigation		Upper Water Watershed
787	AOC	C-16-001	Building (former Platform)	Pre-Investigation		Upper Water Watershed
788	AOC	C-16-002	Soil contamination from former Cooling Tower 16-262	Pre-Investigation		Upper Water Watershed
789	AOC	C-16-005	Soil contamination from former HE Processing Building 16-53	Pre-Investigation		Upper Water Watershed
790	AOC	C-16-006	Soil contamination from former Solvent Storage Building 16-148	Pre-Investigation		Upper Water Watershed
791	AOC	C-16-008	Soil contamination associated with former Structure 16-136	Pre-Investigation		Upper Water Watershed
792	AOC	C-16-009	Soil contamination associated with former Building 16-134	Pre-Investigation		Upper Water Watershed
793	AOC	C-16-010	Soil contamination associated with former Building 16-135	Pre-Investigation		Upper Water Watershed
794	AOC	C-16-011	Soil contamination from former Paint Shop TA-16-132	Pre-Investigation		Upper Water Watershed
795	AOC	C-16-012	Soil contamination associated with former Building 16-138	Pre-Investigation		Upper Water Watershed
796	AOC	C-16-013	Soil contamination associated with former Storage Area	Pre-Investigation		Upper Water Watershed
797	AOC	C-16-014	Soil contamination associated with former Structure 16-144	Pre-Investigation		Upper Water Watershed
798	AOC	C-16-015	Soil contamination associated with former Structure 16-143	Pre-Investigation		Upper Water Watershed
799	AOC	C-16-016	Soil contamination associated with former Structure 16-142	Pre-Investigation		Upper Water Watershed
800	AOC	C-16-017	Soil contamination associated with former Structure 16-502	Pre-Investigation		Upper Water Watershed
801	AOC	C-16-018	Soil contamination associated with former Aboveground Tank	Pre-Investigation		Upper Water Watershed
802	AOC	C-16-019	Soil contamination associated with former Structure 16-19	Pre-Investigation		Upper Water Watershed
803	AOC	C-16-020	Soil contamination associated with former Structure 16-22	Pre-Investigation		Upper Water Watershed
804	SWMU	C-16-025	Soil contamination associated with former Structure 16-8	Pre-Investigation		Upper Water Watershed
805	SWMU	C-16-026	Soil contamination associated with former Structure 16-6	Pre-Investigation		Upper Water Watershed
806	AOC	C-16-028	Soil contamination from Instrument Shop 16-5	Pre-Investigation		Upper Water Watershed
807	AOC	C-16-030	Soil contamination associated with former Tank Housing 16-181	Pre-Investigation		Upper Water Watershed
808	AOC	C-16-031	Soil contamination associated with former Diesel Unit Building 16-182	Pre-Investigation		Upper Water Watershed
809	AOC	C-16-034	Soil contamination associated with Aboveground Tank	Pre-Investigation		Upper Water Watershed
810	AOC	C-16-035	Soil contamination associated with Aboveground Tank	Pre-Investigation		Upper Water Watershed
811	AOC	C-16-036	Soil contamination associated with former Septic System	Pre-Investigation		Upper Water Watershed
812	AOC	C-16-041	Soil contamination associated with former Building 16-198	Pre-Investigation		Upper Water Watershed
813	AOC	C-16-044	Soil contamination associated with former Manhole	Pre-Investigation		Upper Water Watershed
814	AOC	C-16-046	Soil contamination associated with former Manhole	Pre-Investigation		Upper Water Watershed
815	AOC	C-16-047	Soil contamination associated with former Transport area	Pre-Investigation		Upper Water Watershed
816	AOC	C-16-049	Soil contamination associated with former Building 16-475	CoC without Controls	7/2/2012	
817	AOC	C-16-050	Soil contamination associated with former Building 16-482	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
818	AOC	C-16-051	Soil contamination associated with former Transport area	Pre-Investigation		Upper Water Watershed
819	AOC	C-16-058	Soil contamination associated with former Transport area	Pre-Investigation		Upper Water Watershed
820	AOC	C-16-060	Soil contamination associated with former Storage Structure 16-479	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
821	AOC	C-16-061	Soil contamination associated with Building (Former platform)	Pre-Investigation		Upper Water Watershed
822	AOC	C-16-062	Soil contamination associated with former Electrical Manhole	CoC without Controls	7/2/2012	
823	AOC	C-16-063	Soil contamination associated with former Electrical Manhole	CoC without Controls	7/2/2012	
824	AOC	C-16-064	Drum storage area	Pre-Investigation		Upper Water Watershed
825	AOC	C-16-065	Container storage area	Pre-Investigation		Upper Water Watershed
826	AOC	C-16-067	Storage area	Request for CoC Submitted to NMED		

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
827	AOC	C-16-068	Soil contamination associated with former Building 16-522	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
828	AOC	C-16-069	Soil contamination associated with former Trailer 16-87	Pre-Investigation		Upper Water Watershed
829	AOC	C-16-070	Underground tank	Pre-Investigation		Upper Water Watershed
830	AOC	C-16-071	Spill/Non-intentional release area	Pre-Investigation		Upper Water Watershed
831	AOC	C-16-072	Tank - Existence not verified	Pre-Investigation		Upper Water Watershed
832	AOC	C-16-073	Underground Storage Tank	Pre-Investigation		Upper Water Watershed
833	AOC	C-16-074	Storage Area	RFI or Field Work Rpt Submitted to NMED		SIR - S-Site
834	AOC	C-16-075	Spill location near Building 16-340	Pre-Investigation		Upper Water Watershed
835	AOC	C-16-076	Magazine Area A (former TA-28)	Pre-Investigation		Upper Water Watershed
836	AOC	C-16-077	Magazine Area B (former TA-29)	Pre-Investigation		Upper Water Watershed
837	SWMU	18-001(a)	Lagoons	Pre-Investigation		Pajarito Watershed
838	SWMU	18-001(b)	Drainlines	Pre-Investigation		Pajarito Watershed
839	SWMU	18-001(c)	Sump	Pre-Investigation		Pajarito Watershed
840	SWMU	18-002(a)	Firing site	Pre-Investigation		Pajarito Watershed
841	SWMU	18-002(b)	Firing site	Pre-Investigation		Pajarito Watershed
842	AOC	18-002(c)	Former Drop Tower	Pre-Investigation		Pajarito Watershed
843	SWMU	18-003(a)	Settling Pit	Pre-Investigation		Pajarito Watershed
844	SWMU	18-003(b)	Septic System	Pre-Investigation		Pajarito Watershed
845	SWMU	18-003(c)	Septic system	Pre-Investigation		Pajarito Watershed
846	SWMU	18-003(d)	Septic system	Pre-Investigation		Pajarito Watershed
847	SWMU	18-003(e)	Septic system	Pre-Investigation		Pajarito Watershed
848	SWMU	18-003(f)	Septic system	Pre-Investigation		Pajarito Watershed
849	SWMU	18-003(g)	Septic system	Pre-Investigation		Pajarito Watershed
850	SWMU	18-003(h)	Septic system	Pre-Investigation		Pajarito Watershed
851	SWMU	18-004(a)	Waste line	Pre-Investigation		Pajarito Watershed
852	SWMU	18-004(b)	Soil contamination from former Tanks and Pit	Pre-Investigation		Pajarito Watershed
853	SWMU	18-005(a)	Contaminated soil from former magazine 18-15	Pre-Investigation		Pajarito Watershed
854	AOC	18-005(b)	Former Explosive Storage Magazine	CoC without Controls	4/14/2011	
855	AOC	18-005(c)	Former Explosive Storage Magazine	CoC without Controls	4/14/2011	
856	AOC	18-006	Storage Pipe	Pre-Investigation		Pajarito Watershed
857	AOC	18-008	Former Underground tank	Pre-Investigation		Pajarito Watershed
858	AOC	18-010(b)	Outfall	Pre-Investigation		Pajarito Watershed
859	AOC	18-010(c)	Outfall	Pre-Investigation		Pajarito Watershed
860	AOC	18-010(d)	Outfall	Pre-Investigation		Pajarito Watershed
861	AOC	18-010(e)	Outfall	Pre-Investigation		Pajarito Watershed
862	AOC	18-010(f)	Outfall from Building 18-32	Pre-Investigation		Pajarito Watershed
863	AOC	18-011	Soil contamination from former Building 18-23	Pre-Investigation		Pajarito Watershed
864	SWMU	18-012(a)	Outfall from Building 18-116	Pre-Investigation		Pajarito Watershed
865	SWMU	18-012(b)	Outfall from Buildings 18-30 and -31	Pre-Investigation		Pajarito Watershed
866	AOC	18-012(c)	Sump and drainlines	Pre-Investigation		Pajarito Watershed
867	AOC	18-013	Waste Tank	Pre-Investigation		Pajarito Watershed
868	SWMU	19-001	Septic System	CoC without Controls	6/27/2006	
869	SWMU	19-002	Surface Disposal Site	CoC without Controls	6/27/2006	
870	SWMU	19-003	Drainline and Outfall Associated with former Building 19-05	CoC without Controls	6/27/2006	
871	SWMU	20-001(a)	Landfill	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
872	SWMU	20-001(b)	Landfill	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
873	SWMU	20-001(c)	Firing Site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia

Appendix A  
Solid Waste Management Unit/Area of Concern List

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
874	SWMU	20-002(a)	Firing Site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
875	SWMU	20-002(b)	Landfill	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
876	SWMU	20-002(c)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
877	SWMU	20-002(d)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
878	AOC	20-003(b)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
879	AOC	20-003(c)	Firing site	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
880	AOC	20-004	Former Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
881	SWMU	20-005	Septic tank	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
882	AOC	21-001	Container Storage Area	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
883	SWMU	21-002(a)	Container Storage Area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
884	AOC	21-002(b)	Container Storage	CoC without Controls	1/19/2016	
885	SWMU	21-003	Container Storage Area	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
886	AOC	21-004(a)	Aboveground tank	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
887	SWMU	21-004(b)	Aboveground tank	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
888	SWMU	21-004(c)	Aboveground tank	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
889	SWMU	21-006(a)	Underground Seepage Pit	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
890	SWMU	21-006(b)	Underground Seepage pit	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
891	SWMU	21-006(c)	Underground Seepage pit	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
892	SWMU	21-006(d)	Underground Seepage pit	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
893	SWMU	21-006(e)	Underground Seepage pit	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
894	AOC	21-006(f)	Underground Seepage pit	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
895	SWMU	21-007	Soil contamination from former incinerators	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
896	AOC	21-009	Soil contamination associated with former Waste treatment	CoC without Controls	1/19/2016	
897	SWMU	21-010(a)	Soil contamination associated with former Waste treatment facility 21-35	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
898	SWMU	21-010(b)	Soil contamination from former manhole	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
899	SWMU	21-010(c)	Soil contamination from former Underground Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
900	SWMU	21-010(d)	Soil contamination from former Underground Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
901	SWMU	21-010(e)	Soil contamination from former Septic Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
902	SWMU	21-010(f)	Soil contamination from former Grit Chamber	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
903	SWMU	21-010(g)	Soil contamination from former Aboveground Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
904	SWMU	21-010(h)	Soil contamination from former Manhole	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
905	SWMU	21-011(a)	Waste Treatment Facility 21-257	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
906	SWMU	21-011(b)	Sump	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
907	SWMU	21-011(c)	Tank and Sump	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
908	SWMU	21-011(d)	Holding Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
909	SWMU	21-011(e)	Holding Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
910	SWMU	21-011(f)	Holding Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
911	SWMU	21-011(g)	Holding Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
912	AOC	21-011(h)	Soil contamination from former storage tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
913	SWMU	21-011(i)	Storage Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
914	SWMU	21-011(j)	Storage Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
915	SWMU	21-011(k)	Outfall from Building 21-257	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
916	SWMU	21-012(b)	Dry well	CoC without Controls	1/19/2016	
917	SWMU	21-013(a)	Surface Disposal Site	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
918	SWMU	21-013(b)	Surface Disposal Site	CoC with Controls	6/3/2011	
919	SWMU	21-013(c)	Surface disposal site	CoC without Controls	1/19/2016	

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
920	SWMU	21-013(d)	Surface disposal site	CoC without Controls	9/30/2005	
921	SWMU	21-013(e)	Surface disposal site	CoC without Controls	9/30/2005	
922	AOC	21-013(f)	Surface disposal site	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
923	AOC	21-013(g)	Surface disposal site	CoC with Controls	6/3/2011	
924	SWMU	21-014	Material disposal area (MDA) A	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
925	SWMU	21-015	Material disposal area (MDA) B	CoC without Controls	5/15/2015	
926	SWMU	21-016(a)	Absorption Beds (MDA T)	RFI or Field Work in Progress (IM, ACA)		MDAs-A & -T Remedy
927	SWMU	21-016(b)	Soil contamination from a former Storage Pit (MDA T)	RFI or Field Work in Progress (IM, ACA)		MDAs-A & -T Remedy
928	SWMU	21-016(c)	Shafts (MDA T)	RFI or Field Work in Progress (IM, ACA)		MDAs-A & -T Remedy
929	SWMU	21-017(a)	Absorption Bed (MDA U)	CoC with Controls	9/28/2006	
930	SWMU	21-017(b)	Absorption Bed (MDA U)	CoC with Controls	9/28/2006	
931	SWMU	21-017(c)	Soil contamination from former distribution box (MDA U)	CoC with Controls	9/28/2006	
932	SWMU	21-018(a)	Absorption Beds (MDA V)	CoC with Controls	6/3/2011	
933	SWMU	21-018(b)	Soil contamination from former Laundry Facility (MDA V)	CoC without Controls	6/3/2011	
934	SWMU	21-021	Soil contamination from Stack Emissions	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
935	SWMU	21-022(a)	Sump and waste lines	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
936	SWMU	21-022(b)	Soil contamination from former Sump and Waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
937	SWMU	21-022(c)	Soil contamination from former Sump and Waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
938	SWMU	21-022(d)	Soil contamination from former Sump and Waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
939	SWMU	21-022(e)	Soil contamination from former Sump and Waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
940	SWMU	21-022(f)	Sump and Waste line	CoC without Controls	1/19/2016	
941	SWMU	21-022(g)	Soil contamination from former Sump and Waste line	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
942	SWMU	21-022(h)	Sump and Waste line	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
943	SWMU	21-022(i)	Sump and Waste line	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
944	SWMU	21-022(j)	Former Sump and Waste line	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
945	SWMU	21-023(a)	Soil contamination from former Septic System	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
946	SWMU	21-023(b)	Soil contamination from former Septic System	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
947	SWMU	21-023(c)	Septic System	CoC with Controls	6/3/2011	
948	SWMU	21-023(d)	Soil contamination from former Septic System	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
949	SWMU	21-024(a)	Septic system	CoC without Controls	1/19/2016	
950	SWMU	21-024(b)	Septic system	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
951	SWMU	21-024(c)	Septic system	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
952	SWMU	21-024(d)	Septic system	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
953	SWMU	21-024(e)	Septic system	CoC without Controls	1/19/2016	
954	SWMU	21-024(f)	Former Septic system	CoC without Controls	9/30/2005	
955	SWMU	21-024(g)	Septic system	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
956	SWMU	21-024(h)	Septic system	CoC without Controls	1/19/2016	
957	SWMU	21-024(i)	Former Septic system	CoC without Controls	1/19/2016	
958	SWMU	21-024(j)	Septic system	CoC without Controls	1/19/2016	
959	SWMU	21-024(k)	Septic system	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
960	SWMU	21-024(l)	Outfall from Building 21-21	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
961	SWMU	21-024(n)	Drainline	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
962	SWMU	21-024(o)	Drainline	CoC without Controls	1/19/2016	
963	SWMU	21-026(a)	Sewage treatment plant	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
964	SWMU	21-026(b)	Sand Filter/Sludge drying beds	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
965	AOC	21-026(c)	Dosing Siphon Chamber	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
966	AOC	21-026(d)	Outfall from Building 21-227	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup

**Appendix A**  
**Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
967	SWMU	21-027(a)	Drainage System	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
968	SWMU	21-027(c)	Outfall from former Building 21-6	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
969	SWMU	21-027(d)	Soil contamination from former drainline	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
970	AOC	21-028(a)	Container storage Area	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
971	AOC	21-028(c)	Container Storage Area	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Middle LA Cyn
972	AOC	21-028(d)	Container Storage Area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
973	SWMU	21-029	Former DP Tank Farm	CoC without Controls	1/19/2016	
974	AOC	C-21-001	Spill/Non-intentional release area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
975	AOC	C-21-005	Spill/Non-intentional release area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
976	AOC	C-21-006	Spill/Non-intentional release area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
977	AOC	C-21-007	Spill/Non-intentional release area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
978	AOC	C-21-009	Spill/Non-intentional release area	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
979	AOC	C-21-012	Spill/Non-intentional release area	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
980	AOC	C-21-027	Former structure 21-143	RFI or Field Work Rpt Submitted to NMED		TA-21 D&D and Cleanup
981	AOC	C-21-033	Spill/Non-intentional release area	RFI or Field Work in Progress (IM, ACA)		TA-21 D&D and Cleanup
982	AOC	C-21-034	Soil contamination associated with former Tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
983	AOC	C-21-035	Soil contamination associated with former Aboveground tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
984	AOC	C-21-036	Soil contamination associated with former Aboveground tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
985	AOC	C-21-037	Soil contamination associated with former Aboveground tank	RFI or Field Work Rpt Submitted to NMED		MDAs-A & -T Remedy
986	SWMU	22-010(a)	Septic system	Pre-Investigation		Pajarito Watershed
987	SWMU	22-010(b)	Septic system	Pre-Investigation		Pajarito Watershed
988	SWMU	22-011	Disposal pit	Pre-Investigation		Pajarito Watershed
989	SWMU	22-012	Decontamination pad	Pre-Investigation		Pajarito Watershed
990	SWMU	22-014(a)	Sump System	Pre-Investigation		Pajarito Watershed
991	SWMU	22-014(b)	Sump System	Pre-Investigation		Pajarito Watershed
992	SWMU	22-015(a)	Drainlines and Dry Wells	Pre-Investigation		Pajarito Watershed
993	SWMU	22-015(b)	Sump and outfall	Pre-Investigation		Pajarito Watershed
994	SWMU	22-015(c)	Outfall from Building 22-52	Pre-Investigation		Pajarito Watershed
995	SWMU	22-015(d)	Drainline and outfall associated with Building 22-1	Pre-Investigation		Pajarito Watershed
996	SWMU	22-015(e)	Sump	Pre-Investigation		Pajarito Watershed
997	SWMU	22-016	Septic system	Pre-Investigation		Pajarito Watershed
998	SWMU	26-001	Surface disposal site	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
999	SWMU	26-002(a)	Soil contamination from former acid sump system	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
1000	SWMU	26-002(b)	Drainline associated with Vault 26-1	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
1001	SWMU	26-003	Septic tank	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Middle LA Cyn
1002	SWMU	27-002	Firing sites	Pre-Investigation		Pajarito Watershed
1003	SWMU	27-003	Bazooka impact area (Same as AOC 36-009)	Pre-Investigation		Pajarito Watershed
1004	SWMU	31-001	Soil Contamination from former Septic Tank	RFI or Field Work Rpt Submitted to NMED		Historical Properties - Pueblo Cyn
1005	SWMU	32-001	Soil contamination from former Incinerator	CoC without Controls	9/10/2010	
1006	SWMU	32-002(a)	Soil contamination from former septic tank	CoC with Controls	1/29/2013	
1007	SWMU	32-002(b1)	Soil contamination from former septic tank	CoC with Controls	12/28/2012	
1008	SWMU	32-002(b2)	Soil contamination from former septic tank	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
1009	AOC	32-003	Former Transformer Station	CoC without Controls	12/20/2012	
1010	AOC	32-004	Drainline and outfall from former Building 32-3	CoC with Controls	12/28/2012	
1011	SWMU	33-001(a)	Disposal Pit (MDA E)	Pre-Investigation		Southern External Boundary
1012	SWMU	33-001(b)	Disposal Pit (MDA E)	Pre-Investigation		Southern External Boundary
1013	SWMU	33-001(c)	Disposal Pit (MDA E)	Pre-Investigation		Southern External Boundary

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1014	SWMU	33-001(d)	Disposal Pit (MDA E)	Pre-Investigation		Southern External Boundary
1015	SWMU	33-001(e)	Soil contamination from underground chamber and shaft (MDA E)	Pre-Investigation		Southern External Boundary
1016	SWMU	33-002(a)	Septic System (MDA K)	Pre-Investigation		Southern External Boundary
1017	SWMU	33-002(b)	Sump (MDA K)	Pre-Investigation		Southern External Boundary
1018	SWMU	33-002(c)	Sump (MDA K)	Pre-Investigation		Southern External Boundary
1019	SWMU	33-002(d)	Drainline and outfall from former Building 33-86 (MDA K)	Pre-Investigation		Southern External Boundary
1020	SWMU	33-002(e)	Drainline and outfall from former Building 33-86 (MDA K)	Pre-Investigation		Southern External Boundary
1021	SWMU	33-003(a)	Soil contamination from former underground chamber and shaft (MDA D)	Pre-Investigation		Southern External Boundary
1022	SWMU	33-003(b)	Soil contamination from former underground chamber and shaft (MDA D)	Pre-Investigation		Southern External Boundary
1023	SWMU	33-004(a)	Septic System	Pre-Investigation		Southern External Boundary
1024	SWMU	33-004(b)	Septic system	Pre-Investigation		Southern External Boundary
1025	SWMU	33-004(c)	Septic system	Pre-Investigation		Southern External Boundary
1026	SWMU	33-004(d)	Septic system	Pre-Investigation		Southern External Boundary
1027	SWMU	33-004(g)	Drainline and outfall associated with Building 33-16	Pre-Investigation		Southern External Boundary
1028	SWMU	33-004(h)	Drainline and outfall associated with Building 33-20	Pre-Investigation		Southern External Boundary
1029	SWMU	33-004(i)	Drainline and outfall associated with Building 33-39	Pre-Investigation		Southern External Boundary
1030	SWMU	33-004(j)	Outfall from Building 33-26	Pre-Investigation		Southern External Boundary
1031	SWMU	33-004(k)	Drainline and Outfall Associated with Structure 33-87	Pre-Investigation		Southern External Boundary
1032	SWMU	33-004(m)	Septic Tank and Leach Field	Pre-Investigation		Southern External Boundary
1033	SWMU	33-005(a)	Soil contamination from former Septic System	Pre-Investigation		Southern External Boundary
1034	SWMU	33-005(b)	Soil Contamination from former Drainline	Pre-Investigation		Southern External Boundary
1035	SWMU	33-005(c)	Soil Contamination from former Waste Line and Leach Field	Pre-Investigation		Southern External Boundary
1036	SWMU	33-006(a)	Firing site	Pre-Investigation		Southern External Boundary
1037	SWMU	33-006(b)	Firing site	Pre-Investigation		Southern External Boundary
1038	SWMU	33-007(a)	Firing site	Pre-Investigation		Southern External Boundary
1039	SWMU	33-007(b)	Firing Sites	Pre-Investigation		Southern External Boundary
1040	SWMU	33-007(c)	Firing Sites	Pre-Investigation		Southern External Boundary
1041	SWMU	33-008(a)	Landfill	Pre-Investigation		Southern External Boundary
1042	SWMU	33-008(b)	Landfill	Pre-Investigation		Southern External Boundary
1043	SWMU	33-008(c)	Landfill	Pre-Investigation		Southern External Boundary
1044	SWMU	33-009	Surface disposal site	Pre-Investigation		Southern External Boundary
1045	SWMU	33-010(a)	Surface disposal site	Pre-Investigation		Southern External Boundary
1046	SWMU	33-010(b)	Surface disposal site	Pre-Investigation		Southern External Boundary
1047	SWMU	33-010(c)	Surface disposal site	Pre-Investigation		Southern External Boundary
1048	SWMU	33-010(d)	Surface disposal site	Pre-Investigation		Southern External Boundary
1049	SWMU	33-010(f)	Surface Disposal Site (MDA K)	Pre-Investigation		Southern External Boundary
1050	SWMU	33-010(g)	Surface disposal site	Pre-Investigation		Southern External Boundary
1051	SWMU	33-010(h)	Surface disposal site	Pre-Investigation		Southern External Boundary
1052	SWMU	33-011(a)	Soil contamination from former Storage Area	Pre-Investigation		Southern External Boundary
1053	AOC	33-011(b)	Storage Area	Pre-Investigation		Southern External Boundary
1054	SWMU	33-011(c)	Storage Area	Pre-Investigation		Southern External Boundary
1055	SWMU	33-011(d)	Storage Area	Pre-Investigation		Southern External Boundary
1056	SWMU	33-011(e)	Storage Area	Pre-Investigation		Southern External Boundary
1057	SWMU	33-012(a)	Drum storage area	Pre-Investigation		Southern External Boundary

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1058	SWMU	33-013	Drum storage area	CoC with Controls	8/30/2006	
1059	SWMU	33-014	Burn Site	Pre-Investigation		Southern External Boundary
1060	SWMU	33-015	Incinerator	Pre-Investigation		Southern External Boundary
1061	SWMU	33-016	Sump	Pre-Investigation		Southern External Boundary
1062	SWMU	33-017	Operational release	Pre-Investigation		Southern External Boundary
1063	AOC	C-33-001	Former Transformer	Pre-Investigation		Southern External Boundary
1064	AOC	C-33-002	Former Transformer	Pre-Investigation		Southern External Boundary
1065	AOC	C-33-003	Soil contamination	Pre-Investigation		Southern External Boundary
1066	SWMU	35-002	Material disposal area (MDA X)	CoC without Controls	6/30/2011	
1067	SWMU	35-003(a)	Former underground storage tank	CoC with Controls	6/30/2011	
1068	SWMU	35-003(b)	Former underground storage tank	CoC with Controls	6/30/2011	
1069	SWMU	35-003(c)	Former underground storage tank	CoC with Controls	6/30/2011	
1070	SWMU	35-003(d)	Soil contamination from former Building 35-10	CoC with Controls	6/30/2011	
1071	SWMU	35-003(e)	Soil contamination from former storage tank	CoC with Controls	6/30/2011	
1072	SWMU	35-003(f)	Soil contamination from former flocculator tank	CoC with Controls	6/30/2011	
1073	SWMU	35-003(g)	Soil contamination from former Regenerate tank	CoC with Controls	6/30/2011	
1074	SWMU	35-003(h)	Soil contamination from former Retention tank	CoC with Controls	10/14/2015	
1075	SWMU	35-003(j)	Soil contamination from former storage tank	CoC with Controls	6/30/2011	
1076	SWMU	35-003(k)	Soil contamination from former storage tank	CoC with Controls	6/30/2011	
1077	SWMU	35-003(l)	Soil Contamination from former Pump Pit	CoC with Controls	6/30/2011	
1078	SWMU	35-003(m)	Soil contamination from former Sludge tank	CoC with Controls	6/30/2011	
1079	SWMU	35-003(n)	Former phase separator pit	CoC with Controls	6/30/2011	
1080	SWMU	35-003(o)	Soil contamination from former manhole	CoC with Controls	6/30/2011	
1081	SWMU	35-003(p)	Former air-filter building	CoC with Controls	10/14/2015	
1082	SWMU	35-003(q)	Soil contamination from former pipe trench	CoC with Controls	6/30/2011	
1083	AOC	35-003(r)	Outfall associated with former Building 35-10	CoC with Controls	10/14/2015	
1084	AOC	35-003(misc)	Soil contamination from former Industrial Waste lines	CoC with Controls	6/30/2011	
1085	SWMU	35-004(a)	Container Storage Area	CoC without Controls	10/14/2015	
1086	SWMU	35-004(b)	Container Storage Area	CoC without Controls	6/30/2011	
1087	SWMU	35-004(g)	Container Storage Area	CoC without Controls	6/30/2011	
1088	SWMU	35-004(h)	Container storage area	CoC without Controls	10/14/2015	
1089	AOC	35-004(m)	Container storage area	CoC without Controls	6/30/2011	
1090	SWMU	35-008	Surface disposal site	CoC without Controls	10/14/2015	
1091	SWMU	35-009(a)	Septic system	CoC with Controls	10/14/2015	
1092	SWMU	35-009(b)	Septic system	CoC without Controls	6/30/2011	
1093	SWMU	35-009(c)	Septic system	CoC without Controls	6/30/2011	
1094	SWMU	35-009(d)	Septic system	CoC without Controls	10/14/2015	
1095	SWMU	35-009(e)	Drainline	CoC with Controls	6/30/2011	
1096	SWMU	35-010(a)	Wastewater Treatment Lagoons	CoC without Controls	6/30/2011	
1097	SWMU	35-010(b)	Wastewater Treatment Lagoons	CoC without Controls	6/30/2011	
1098	SWMU	35-010(c)	Wastewater Treatment Lagoons	CoC without Controls	6/30/2011	
1099	SWMU	35-010(d)	Filter Beds	CoC without Controls	6/30/2011	
1100	AOC	35-010(e)	Discharge headwall and sand filter associated with Structure 35-215 (includes 35-010(misc))	CoC without Controls	10/14/2015	
1101	SWMU	35-013(a)	Sumps	Deferred Site		
1102	SWMU	35-013(b)	Sumps	Deferred Site		
1103	SWMU	35-013(c)	Sumps	Deferred Site		

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1104	SWMU	35-014(a)	Operational release from former Building 35-7	CoC without Controls	6/30/2011	
1105	SWMU	35-014(b)	Soil contamination from leaking drum	CoC with Controls	6/30/2011	
1106	AOC	35-014(d)	Soil contamination from Valve system for former storage tanks	CoC with Controls	6/30/2011	
1107	SWMU	35-014(e)	Spill/Non-intentional release area	CoC without Controls	10/14/2015	
1108	AOC	35-014(e2)	Soil contamination associated with overflows from waste oil	CoC with Controls	9/27/2013	
1109	AOC	35-014(f)	Soil contamination from oil-handling system	CoC without Controls	6/30/2011	
1110	SWMU	35-014(g)	Spill/Non-intentional release area	CoC without Controls	10/14/2015	
1111	AOC	35-014(g2)	Soil contamination from former leaking containers	CoC without Controls	6/30/2011	
1112	AOC	35-014(g3)	Spill/Non-intentional release area	CoC with Controls	10/14/2015	
1113	SWMU	35-015(a)	Soil contamination from former tank farm and waste-oil treatment facility	CoC with Controls	6/30/2011	
1114	SWMU	35-015(b)	Soil contamination from former waste oil treatment facility	CoC with Controls	6/30/2011	
1115	SWMU	35-016(a)	Drain and outfall from Building 35-34	CoC without Controls	10/14/2015	
1116	AOC	35-016(b)	Drain and Outfall from Building 35-87	CoC without Controls	10/14/2015	
1117	SWMU	35-016(c)	Drain and Outfall from Building 35-67	CoC with Controls	10/14/2015	
1118	SWMU	35-016(d)	Drain and Outfall from Building 35-46	CoC with Controls	10/14/2015	
1119	AOC	35-016(e)	Drain and Outfall from Building 35-85	CoC without Controls	10/14/2015	
1120	AOC	35-016(f)	Storm drain and Outfall	CoC without Controls	10/14/2015	
1121	AOC	35-016(g)	Drain and Outfall from Building 35-213	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1122	AOC	35-016(h)	Storm drains and Outfall associated with Building 35-213	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1123	SWMU	35-016(i)	Storm drains and Outfall	CoC with Controls	9/27/2013	
1124	AOC	35-016(j)	Storm drain and Outfall associated with Building 35-125	CoC with Controls	6/30/2011	
1125	SWMU	35-016(k)	Drainline and outfall from Building 35-29	CoC with Controls	10/14/2015	
1126	AOC	35-016(l)	Storm drains	CoC with Controls	10/14/2015	
1127	SWMU	35-016(m)	Drain lines and Outfall associated with Cooling Tower 35-33	CoC without Controls	10/14/2015	
1128	AOC	35-016(n)	Storm drain and Outfall associated with Building 35-86	CoC without Controls	10/14/2015	
1129	SWMU	35-016(o)	Storm Drains and outfalls	CoC with Controls	10/14/2015	
1130	SWMU	35-016(p)	Outfall from Building 35-27	CoC without Controls	10/14/2015	
1131	SWMU	35-016(q)	Storm waster collection basins	CoC without Controls	10/14/2015	
1132	AOC	35-018(a)	Former Transformer	CoC with Controls	6/30/2011	
1133	AOC	C-35-007	Soil contamination associated with WWTP/Sand Filters	CoC without Controls	6/30/2011	
1134	SWMU	36-001	Material disposal area (MDA) AA	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
1135	SWMU	36-002	Former Sump	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
1136	SWMU	36-003(a)	Septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Threemile
1137	SWMU	36-003(b)	Septic system, I-J Site	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
1138	AOC	36-004(a)	Firing site	Deferred Site		
1139	AOC	36-004(b)	Firing site	Deferred Site		
1140	AOC	36-004(c)	Firing site	Deferred Site		
1141	SWMU	36-004(d)	Firing site	Deferred Site		
1142	AOC	36-004(e)	Firing site	Deferred Site		
1143	SWMU	36-005	Surface Storage Area	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
1144	SWMU	36-006	Surface Disposal Site	RFI or Field Work Rpt Submitted to NMED		SIR - Potrillo/Fence
1145	SWMU	36-008	New SWMU-Surface disposal Area located near Building 36-1	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
1146	AOC	C-36-001	Containment vessel	Deferred Site		
1147	SWMU	C-36-003	Outfall from Building 36-1	RFI or Field Work Rpt Submitted to NMED		Known Cleanup Sites (Above SSLs)
1148	AOC	C-36-006(e)	I-J Firing Site, projectile test area	Deferred Site		
1149	SWMU	39-001(a)	Landfill	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1150	SWMU	39-001(b)	Disposal pits (MDA Y)	CoC without Controls	4/6/2010	Known Cleanup Sites (Above SSLs)
1151	SWMU	39-002(a)	Storage area	Deferred Site		
1152	AOC	39-002(b)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - N Ancho
1153	AOC	39-002(c)	Storage area	CoC without Controls	4/6/2010	
1154	AOC	39-002(d)	Storage area	CoC without Controls	4/6/2010	
1155	AOC	39-002(e)	Storage area	CoC without Controls	4/6/2010	
1156	AOC	39-002(f)	Storage area	CoC without Controls	4/6/2010	
1157	SWMU	39-004(a)	Firing site	Deferred Site		
1158	SWMU	39-004(b)	Firing site	Deferred Site		
1159	SWMU	39-004(c)	Firing site TA-39-6	Deferred Site		
1160	SWMU	39-004(d)	Firing site TA-39-57	Deferred Site		
1161	SWMU	39-004(e)	Firing site	Deferred Site		
1162	SWMU	39-005	Potential soil contamination associated with former Seepage pit	CoC without Controls	4/6/2010	
1163	SWMU	39-006(a)	Septic system	Deferred Site		
1164	SWMU	39-007(a)	Storage area	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
1165	AOC	39-007(d)	Storage area	CoC without Controls	4/6/2010	
1166	SWMU	39-008	Disposal Trenches	Deferred Site		
1167	SWMU	39-010	Excavated soil pile	RFI or Field Work in Progress (IM, ACA)		SIR - N Ancho
1168	SWMU	40-001(b)	Septic system	Pre-Investigation		Pajarito Watershed
1169	SWMU	40-001(c)	Septic system	Pre-Investigation		Pajarito Watershed
1170	AOC	40-003(b)	Burning area	Pre-Investigation		Pajarito Watershed
1171	SWMU	40-004	Operational release	Pre-Investigation		Pajarito Watershed
1172	SWMU	40-005	Sump	Pre-Investigation		Pajarito Watershed
1173	SWMU	40-006(a)	Firing site	Deferred Site		
1174	SWMU	40-006(b)	Firing site	Deferred Site		
1175	SWMU	40-006(c)	Firing site	Deferred Site		
1176	AOC	40-007(a)	Storage area	Pre-Investigation		Pajarito Watershed
1177	AOC	40-007(b)	Storage area	Pre-Investigation		Pajarito Watershed
1178	AOC	40-007(c)	Storage area	Pre-Investigation		Pajarito Watershed
1179	AOC	40-007(d)	Storage area	Pre-Investigation		Pajarito Watershed
1180	AOC	40-007(e)	Storage area	Pre-Investigation		Pajarito Watershed
1181	SWMU	40-009	Landfill	Pre-Investigation		Pajarito Watershed
1182	SWMU	40-010	Surface disposal site	Pre-Investigation		Pajarito Watershed
1183	SWMU	41-001	Septic Tank	CoC without Controls	9/10/2010	
1184	SWMU	41-002(a)	Imhoff Tank	Deferred Site		
1185	SWMU	41-002(b)	Chlorine Contact Tank	Deferred Site		
1186	SWMU	41-002(c)	Sludge Drying Bed	Deferred Site		
1187	AOC	41-003	Sump	Deferred Site		
1188	AOC	C-41-004	Storm drains	Deferred Site		
1189	SWMU	42-001(a)	Soil contamination from former Incinerator Building 42-1	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1190	SWMU	42-001(b)	Soil contamination from former Ash storage tank	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1191	SWMU	42-001(c)	Soil contamination from former Ash storage tank	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1192	AOC	42-002(a)	Soil contamination from former Vacublyster and storage area	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1193	SWMU	42-002(b)	Soil contamination from former Decontamination area	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1194	SWMU	42-003	Soil contamination from former Septic System	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1195	SWMU	43-001(a)	Waste lines (LANS call this (a1))	Deferred Site		
1196	AOC	43-001(a2)	Waste lines	Deferred Site		

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Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1197	AOC	43-001(b2)	Outfall from Building 43-1	CoC with Controls	9/10/2010	
1198	SWMU	43-002	Former Incinerator	Deferred Site		
1199	AOC	C-43-001	Storm Drain associated with Building 43-1 Loading Dock	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
1200	SWMU	45-001	Soil contamination from former RLW Treatment Plant	CoC without Controls	2/22/2013	
1201	SWMU	45-002	Soil contamination from former Decontamination Facility	CoC without Controls	2/22/2013	
1202	SWMU	45-003	Soil contamination from former Waste lines	CoC without Controls	2/22/2013	
1203	SWMU	45-004	Sanitary sewer outfall	CoC without Controls	2/22/2013	
1204	AOC	C-45-001	Soil contamination from spill in parking lot south of former RLW Treatment Plant	CoC without Controls	2/22/2013	
1205	SWMU	46-002	Surface Impoundment	CoC without Controls	7/13/2012	
1206	SWMU	46-003(a)	Septic system	Deferred Site		
1207	SWMU	46-003(b)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1208	SWMU	46-003(c)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1209	SWMU	46-003(d)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1210	SWMU	46-003(e)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1211	SWMU	46-003(f)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1212	SWMU	46-003(g)	Septic system	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1213	SWMU	46-003(h)	Outfall from Building 46-77	CoC without Controls	11/29/2005	
1214	SWMU	46-004(a)	Waste line	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1215	SWMU	46-004(a2)	Outfall associated with Building 46-31	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1216	SWMU	46-004(b)	Soil contamination associated with former tank	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1217	SWMU	46-004(b2)	Outfall associated with Building 46-1	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1218	SWMU	46-004(c)	Dry Well	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1219	SWMU	46-004(c2)	Outfall from Building 46-1	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1220	SWMU	46-004(d)	Dry well	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1221	SWMU	46-004(d2)	Soil Contamination from Stack Emissions	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1222	SWMU	46-004(e)	Dry well	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1223	AOC	46-004(e2)	Outfall from Building 46-42	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1224	SWMU	46-004(f)	Drain associated with Building 46-24	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1225	AOC	46-004(f2)	Outfall from Building 46-31	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1226	SWMU	46-004(g)	Drains and Exhaust System	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1227	SWMU	46-004(h)	Drains and Exhaust System	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1228	SWMU	46-004(m)	Outfall from Building 46-30	CoC without Controls	7/13/2012	
1229	SWMU	46-004(p)	Dry Well	CoC without Controls	7/13/2012	
1230	SWMU	46-004(q)	Outfall	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
1231	SWMU	46-004(r)	Outfall from Building 46-24	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1232	SWMU	46-004(s)	Outfall associated with Building 46-1	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1233	SWMU	46-004(t)	Outfall from Building 46-88	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1234	SWMU	46-004(u)	Outfall from Building 46-87	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1235	SWMU	46-004(v)	Outfall from Building 46-87	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1236	SWMU	46-004(w)	Outfall from Building 46-59	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1237	SWMU	46-004(x)	Outfall from Building 46-31	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1238	SWMU	46-004(y)	Outfall from Building 46-31	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1239	SWMU	46-004(z)	Outfall from Building 46-31	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1240	SWMU	46-005	Surface impoundment	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1241	SWMU	46-006(a)	Operational release	RFI or Field Work in Progress (IM, ACA)		SIR - U Canada del Buey
1242	SWMU	46-006(b)	Former storage shed	CoC without Controls	7/13/2012	

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Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1243	SWMU	46-006(c)	Operational release	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1244	SWMU	46-006(d)	Operational release	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1245	SWMU	46-006(f)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1246	SWMU	46-006(g)	Storage area	CoC without Controls	7/13/2012	
1247	SWMU	46-007	Operational release	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1248	SWMU	46-008(a)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1249	SWMU	46-008(b)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1250	SWMU	46-008(d)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1251	SWMU	46-008(e)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1252	SWMU	46-008(f)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1253	SWMU	46-008(g)	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1254	SWMU	46-009(a)	Landfill	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1255	SWMU	46-009(b)	Surface disposal site	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1256	SWMU	46-010(d)	Storage Area	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1257	AOC	C-46-001	Spill/Non-intentional release area	CoC without Controls	7/13/2012	
1258	AOC	C-46-002	Soil contamination from stack emissions - Non-intentional release	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1259	AOC	C-46-003	Soil contamination from stack emissions - Non-intentional release	RFI or Field Work in Progress (IM, ACA)		SIR - U. Canada del Buey
1260	AOC	48-001	Air exhaust system	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1261	SWMU	48-002(a)	Container storage area	RFI or Field Work in Progress (IM, ACA)		SIR - Mortandad
1262	SWMU	48-002(b)	Container storage area	RFI or Field Work in Progress (IM, ACA)		SIR - Mortandad
1263	AOC	48-002(e)	Container storage	CoC without Controls	9/7/2010	
1264	SWMU	48-003	Soil contamination associated with former septic system	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1265	SWMU	48-004(a)	Sumps	Deferred Site		
1266	SWMU	48-004(b)	Tanks	Deferred Site		
1267	SWMU	48-004(c)	Tanks	Deferred Site		
1268	SWMU	48-005	Waste lines	Deferred Site		
1269	SWMU	48-007(a)	Outfall associated with Building 48-1	CoC with Controls	9/7/2010	
1270	SWMU	48-007(b)	Outfall from Building 48-1	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1271	SWMU	48-007(c)	Outfall from Building 48-1	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1272	SWMU	48-007(d)	Outfall associated with Building 48-1	CoC with Controls	9/7/2010	
1273	SWMU	48-007(f)	Outfall from Building 48-46	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1274	SWMU	48-010	Surface Impoundment	CoC with Controls	9/7/2010	
1275	AOC	48-011	Disposal shaft	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1276	SWMU	48-012	Soil Contamination	CoC with Controls	9/7/2010	
1277	SWMU	49-001(a)	Shafts at Area 1 (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1278	SWMU	49-001(b)	Shafts at Area 2 (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1279	SWMU	49-001(c)	Shafts at Area 2A (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1280	SWMU	49-001(d)	Shafts at Area 2B (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1281	SWMU	49-001(e)	Shafts at Area 3 (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1282	SWMU	49-001(f)	Shafts at Area 4 (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1283	SWMU	49-001(g)	Soil contamination (MDA AB)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1284	AOC	49-002	Operational facility (Area 10 underground chamber)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Outside
1285	SWMU	49-003	Leach field (Area 11 rad/chem and small shot area)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1286	SWMU	49-004	Burn site and landfill (Area 6)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Outside
1287	SWMU	49-005(a)	Landfill (east of Area 10)	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Outside
1288	AOC	49-005(b)	Landfill - Area 5	CoC without Controls	2/21/2011	
1289	SWMU	49-006	Sump (Area 5)	CoC without Controls	2/21/2011	

Appendix A  
Solid Waste Management Unit/Area of Concern List

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1290	AOC	49-008(a)	Soil contamination (Area 5)	Deferred Site		
1291	AOC	49-008(b)	Soil contamination (Area 6)	Deferred Site		
1292	AOC	49-008(c)	Soil contamination (Area 11)	Deferred Site		
1293	AOC	49-008(d)	Firing sites (Bottle House area) soil contamination and underground chamber	RFI or Field Work in Progress (IM, ACA)		SIR - TA-49 Inside
1294	SWMU	50-001(a)	Waste treatment facility	Deferred Site		
1295	AOC	50-001(b)	Waste lines	Deferred Site		
1296	SWMU	50-002(a)	Underground tanks	Deferred Site		
1297	SWMU	50-002(b)	Vaulted underground tank	Deferred Site		
1298	SWMU	50-002(c)	Vaulted underground tank	Deferred Site		
1299	AOC	50-002(d)	Aboveground storage tank	Deferred Site		
1300	SWMU	50-004(a)	Soil contamination from former waste lines	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1301	SWMU	50-004(b)	Soil contamination from former vault and Tanks	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1302	SWMU	50-004(c)	Soil contamination from former Waste lines and Manholes	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1303	SWMU	50-006(a)	Operational release	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1304	SWMU	50-006(c)	Operational release	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1305	SWMU	50-006(d)	Outfall associated with Building 50-1	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
1306	AOC	50-007	Former Incinerator complex	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1307	AOC	50-008	Reduction site	RFI or Field Work Rpt Submitted to NMED		SIR - Mortandad
1308	SWMU	50-009	Material disposal area (MDA C)	CME Submitted to NMED		MDA-C Remedy
1309	AOC	50-010	Decontamination facility	Deferred Site		
1310	SWMU	50-011(a)	Soil contamination associated with former Septic system (includes SWMU 50-011 (misc))	Deferred Site		
1311	AOC	50-011(b)	Lift stations	Deferred Site		
1312	AOC	C-50-001	Former Transformer	Pre-Investigation		Pajarito Watershed
1313	AOC	51-001	Former Septic system	CoC without Controls	4/14/2011	
1314	SWMU	52-001(d)	Former facility equipment	CoC without Controls	7/13/2012	
1315	SWMU	52-002(a)	Septic system	CoC without Controls	6/30/2011	
1316	AOC	52-003(a)	Former Wastewater Treatment Plant	CoC without Controls	6/30/2011	
1317	SWMU	53-001(a)	Storage area	RFI or Field Work in Progress (IM, ACA)		Known Cleanup Sites (Above SSLs)
1318	SWMU	53-001(b)	Storage area	CoC without Controls	7/31/2013	
1319	SWMU	53-002(a)	Former surface impoundment	CoC with Controls	9/13/2006	
1320	SWMU	53-002(b)	Former surface impoundment	CoC with Controls	9/13/2006	
1321	SWMU	53-005	Soil contamination from former disposal pit	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
1322	SWMU	53-006(b)	Underground tank	Deferred Site		
1323	SWMU	53-006(c)	Underground tank	Deferred Site		
1324	SWMU	53-006(d)	Underground tank	Deferred Site		
1325	SWMU	53-006(e)	Underground tank	Deferred Site		
1326	SWMU	53-006(f)	Underground tank	Deferred Site		
1327	SWMU	53-007(a)	Aboveground neutralizer tank	Deferred Site		
1328	AOC	53-008	Storage area	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
1329	AOC	53-009	Aboveground tanks	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
1330	AOC	53-010	Container storage	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
1331	AOC	53-012(e)	Outfall from Building 53-2	RFI or Field Work in Progress (IM, ACA)		SIR - L. Sandia
1332	SWMU	53-013	Soil contamination - Lead storage site I	CoC without Controls	7/31/2013	
1333	SWMU	53-014	Soil contamination - Lead storage site II	CoC without Controls	7/31/2013	
1334	SWMU	53-015	Radioactive Liquid Waste Treatment System	Deferred Site		

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1335	SWMU	54-004	MDA H	CME Submitted to NMED		MDA-H Remedy
1336	SWMU	54-005	MDA J	RFI or Field Work Rpt Submitted to NMED		
1337	SWMU	54-006	MDA L	CME Submitted to NMED		MDAs-G & -L Remedies
1338	SWMU	54-007(a)	Former Septic system (includes SWMU 54-007 (misc))	CoC without Controls	5/29/2007	
1339	AOC	54-007(d)	Former Septic system (includes SWMU 54-007(misc))	CoC without Controls	4/14/2011	
1340	AOC	54-012(a)	Former drum compactor	Pre-Investigation		Pajarito Watershed
1341	SWMU	54-012(b)	Drum crusher	Pre-Investigation		Pajarito Watershed
1342	SWMU	54-013(b)	Vehicle Monitoring/Decontamination area (MDA G)	CME Submitted to NMED		MDAs-G & -L Remedies
1343	AOC	54-014(a)	Storage Shafts at MDA L	RFI or Field Work in Progress (IM, ACA)		Other
1344	SWMU	54-014(b)	Pit 9 (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1345	SWMU	54-014(c)	Shafts 200-233 (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1346	SWMU	54-014(d)	Storage trenches A, B, C, and D (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1347	AOC	54-015(b)	Storage Area	Pre-Investigation		Pajarito Watershed
1348	SWMU	54-015(k)	Layer of TRU waste	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1349	AOC	54-016(b)	Sump	Pre-Investigation		Pajarito Watershed
1350	SWMU	54-017	Disposal Pits (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1351	SWMU	54-018	Disposal Pits (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1352	SWMU	54-019	Disposal Pits (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1353	SWMU	54-020	Disposal Shafts MDA G	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1354	SWMU	54-023	Disposal Pit 38 (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1355	SWMU	54-024	Disposal Pit 39 (MDA G)	RFI or Field Work in Progress (IM, ACA)		MDAs-G & -L Remedies
1356	SWMU	55-008	Sumps and tanks	Deferred Site		
1357	AOC	57-001(b)	Former Settling ponds	RFI or Field Work Rpt Submitted to NMED		Other
1358	AOC	57-001(c)	Former Settling ponds	RFI or Field Work Rpt Submitted to NMED		Other
1359	AOC	57-002	Sludge pit	RFI or Field Work Rpt Submitted to NMED		Other
1360	AOC	57-004(a)	Former Settling ponds	RFI or Field Work Rpt Submitted to NMED		Other
1361	AOC	57-004(b)	Former Settling ponds	RFI or Field Work Rpt Submitted to NMED		Other
1362	AOC	57-006	Former Drum and contents	RFI or Field Work Rpt Submitted to NMED		Other
1363	AOC	57-007	Leach field	RFI or Field Work Rpt Submitted to NMED		Other
1364	AOC	59-004	Outfall from Building 59-1	Pre-Investigation		Pajarito Watershed
1365	AOC	C-59-001	Transformer	Deferred Site		
1366	SWMU	60-002	Storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1367	AOC	60-004(b)	Storage area	CoC without Controls	2/18/2011	
1368	AOC	60-004(c)	Storage area	CoC without Controls	6/30/2011	
1369	AOC	60-004(d)	Storage area	CoC without Controls	2/18/2011	
1370	AOC	60-004(e)	Storage area	CoC without Controls	6/30/2011	
1371	AOC	60-004(f)	Storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1372	SWMU	60-005(a)	Surface impoundment	CoC without Controls	6/30/2011	
1373	SWMU	60-006(a)	Septic System	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1374	SWMU	60-007(a)	Operational Release	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
1375	SWMU	60-007(b)	Operational Release	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1376	SWMU	61-002	Transformer storage area	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1377	SWMU	61-005	Landfill (Los Alamos municipal)	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1378	SWMU	61-006	Waste oil tank (renumbered from 00-002)	RFI or Field Work Rpt Submitted to NMED		Sandia Canyon Watershed
1379	SWMU	61-007	Soil contamination associated with transformer staging area	RFI or Field Work in Progress (IM, ACA)		Historical Properties - Upper LA Cyn
1380	AOC	C-61-002	Subsurface contamination	RFI or Field Work in Progress (IM, ACA)		Sandia Canyon Watershed
1381	SWMU	63-001(a)	Septic system	CoC without Controls	6/30/2011	

**Appendix A  
Solid Waste Management Unit/Area of Concern List**

Count	SWMU/AOC	Unit #	Unit Type	Status *	Date	Campaign **
1382	SWMU	63-001(b)	Septic system	CoC without Controls	6/30/2011	
1383	SWMU	69-001	Two-Mile Incinerator Facility	Pre-Investigation		Pajarito Watershed
1384	AOC	72-001	Firing range	Deferred Site		
1385	SWMU	73-001(a)	Landfill	RFI or Field Work in Progress (IM, ACA)		Airport Cover Replacement
1386	SWMU	73-001(b)	Soil contamination from former waste oil pit	RFI or Field Work in Progress (IM, ACA)		Airport Cover Replacement
1387	SWMU	73-001(c)	Bunkers	RFI or Field Work in Progress (IM, ACA)		Airport Cover Replacement
1388	SWMU	73-001(d)	Landfill	RFI or Field Work in Progress (IM, ACA)		Airport Cover Replacement
1389	SWMU	73-002	Incinerator Surface Disposal	CoC with Controls	8/13/2007	
1390	AOC	73-003	Soil contamination from former Steam cleaning plant	CoC with Controls	8/13/2007	
1391	SWMU	73-004(a)	Former septic tank	CoC with Controls	8/13/2007	
1392	SWMU	73-004(b)	Former septic tank	CoC with Controls	8/13/2007	
1393	SWMU	73-004(c)	Septic System	CoC without Controls	1/23/2008	
1394	SWMU	73-004(d)	Soil contamination form former septic tank	RFI or Field Work in Progress (IM, ACA)		Airport Cover Replacement
1395	SWMU	73-006	Airport Building Outfalls	CoC with Controls	8/13/2007	

\* CoC-Certification of Completion

69 CoCs with Controls; 174 CoCs without Controls; 127 Deferred Sites.

\*\* "Other" campaign is defined as sites that are not listed in an identified campaign in Appendix C.

**APPENDIX B**  
**MILESTONES AND TARGETS**

Appendix B MILESTONES AND TARGETS

		FY 2017 MILESTONES			FY 2018 TARGETS			FY 2019 TARGETS		
Campaign	Milestone #	Milestone	Milestone Description	Milestone Date	Target	Target Description	Target Date	Target	Target Description	Target Date
	11	Annual Update to the Interim Facility-Wide Groundwater Monitoring Plan (IGMWP) for AY2018 (October 2017-September 2018)	Annual update to the groundwater monitoring program baseline document with adjustments to sampling, monitoring groups, analysis, and frequencies based on previous results.	5/30/2017	Annual Update to the Interim Facility-Wide Groundwater Monitoring Plan (IGMWP) for AY2018 (October 2017-September 2018)	Annual update to the groundwater monitoring program baseline document with adjustments to sampling, monitoring groups, analysis, and frequencies based on previous results.	6/30/2018	Annual Update to the Interim Facility-Wide Groundwater Monitoring Plan (IGMWP) for AY2020 (October 2019-September 2020)	Annual update to the groundwater monitoring program baseline document with adjustments to sampling, monitoring groups, analysis, and frequencies based on previous results.	6/30/2019
	7	Annual Monitoring REPORT for the Completed FY and PLM for the upcoming FY for Los Alamos/Pueblo Watershed Sediment Transport Mitigation Project	Annual report of last year's results and update to plan for the upcoming year based on last year's observations. Both the annual report and the plan address the performance of stormwater controls installed in the LA/Pueblo watershed. Includes LDMR survey data.	4/30/2017	The Completed FY and PLM for the upcoming FY for Los Alamos/Pueblo Watershed Sediment Transport Mitigation Project	Annual report of last year's results and update to plan for the upcoming year based on last year's observations. Both the annual report and the plan address the performance of stormwater controls installed in the LA/Pueblo watershed. Includes LDMR survey data.	6/30/2018	Annual Monitoring REPORT for the Completed FY and PLM for the upcoming FY for Los Alamos/Pueblo Watershed Sediment Transport Mitigation Project	Annual report of last year's results and update to plan for the upcoming year based on last year's observations. Both the annual report and the plan address the performance of stormwater controls installed in the LA/Pueblo watershed. Includes LDMR survey data.	6/30/2019
Chromium IM & Characterization	5	Chromium DETECTION WELL (4) completion reports for FY2016	Campaign level milestones for substantial of all four (4) W&M Completion Reports for detection wells installed in FY2016 that are required for Chromium IM	3/31/2017	Chromium Corrective Measures Evaluation (CME) Report completed and submitted to NMEED-HWB	The CME will be the culmination of the chromium investigatory activities and will include a recommendation of a remedy.	9/30/2018	Chromium Source Control Corrective Measures Implementation (CMI) Plan completed and submitted to NMEED-HWB	This milestone is the detailed implementation plan for executing the chromium remedy selected by NMEED. (Data is dependent on the NMEED development of a statement of basis).	6/30/2019
Chromium OA & Characterization	10	Chromium EXTRACTION WELL evaluation report and Recommendation on CCE-2	Campaign level milestones for substantial of the well evaluation report based on CCE-1 and CCE-3 data that is required for Chromium Characterization Work Plan specification for CCE-2 for additional boundary withdrawal.	5/1/2017						
Chromium IM & Characterization	13	Initial Operation of Chromium Interim Measures for Plume Control	Field completion milestones reflecting the initiation of pumping from CCE-1, treatment of withdrawn water, and re-injection of treated water. This milestone shall be reported after 24-hours of operation of the corrected equipment without failure and collection of the first sampling event.	9/30/2017						
Historical Properties - Upper LA Dm	12	Status Report for the Cleanup of Former SWMUs and AOCs (Historical Activities)	This milestone is a field completion status report of corrective action complete at the following former SWMUs and AOCs: <ul style="list-style-type: none"> <li>01-00110L</li> <li>01-00310L, (Jessec Lahn)</li> <li>01-00610L, (Jessec Lahn)</li> <li>01-00710L, (Jessec Lahn)</li> <li>01-00710L, (Jessec Lahn)</li> </ul>	6/30/2017	Upper Los Alamos Canyon Aggregate Area (including former TA-21) Phase II Cleanup Complete and Investigation Report Submitted to NMEED	Campaign level milestones for completion of all SWMUs/AOCs in Upper LA O&A and development and substantial for the Investigation Report. This report would include those DOE SWMUs on the back-side of private property (including SWMUs cleanup in former TA-32 and separately reported). Results currently planned to be	9/30/2018			
Historical Properties - Middle LA Dm	14	Middle Los Alamos Canyon Aggregate Area Cleanup Field Completion	Field cleanup progress milestone SWMUs and AOCs that were identified in the Phase I and II investigations and requires remediation to less than SLS which includes a PCB cleanup at AOC 02-01114.	9/30/2017	Middle Los Alamos Canyon Phase III Investigation Report Submitted to NMEED	This milestone is the interim investigations for this aggregate area and will document the completion activities for all cleanups, ECDR&A studies, a risk assessment for all sites within the aggregate area, and the recommendation for whether controls are required with a potential cessation of completion.	9/30/2018			
Historical Properties Completion										

Appendix B MILESTONES AND TARGETS

		FY 2017 MILESTONES			FY 2018 TARGETS			FY 2019 TARGETS			
Campaign	Milestone #	Milestones	Milestone Description	Milestone Date	Target	Target Description	Target Date	Target	Target Description	Target Date	
RDX Characterization	4	RDX Tracer Deployment Test Complete	Although the tracer test shall be physically completed, this milestone includes a summary report of the test and substantial of the relevant test data. The report will not include analysis of the data which will be included in the CME.	2/14/2017							
	6	CAV-5 IIG Analyte Test Complete and Report Submitted to NMED-HMWB	Although the analyte test shall be physically completed, this milestone includes a summary report of the test and substantial of the relevant data. This report will not include analysis of the data which will be included in the CME.	4/7/2017							
	15	Final Corrective Measures Evaluation (CME) Report for RDX 1A-16 Submitted to NMED-HMWB	The CME shall conduct the evaluation of the remaining corrective actions from the surface CMI and conduct the evaluation of information gathered for the subsurface. This CME shall also include a recommendation for an RDX remedy covering both surface and subsurface.	9/30/2017	RDX Surface Cleanup Work Plan Completed and submitted to NMED-HMWB	Surface Cleanup WP for any necessary immediate actions addressing either surface or subsurface water measures necessary before the CME can be completed and a remedy is selected by NMED.	9/30/2018				
	1	Supplemental Investigation Report 1A-49 Aggregate Area - Inside HES	Supplemental Investigation Report prepared to pair risk assessment with previous investigation results.	10/31/2016							
	3	Supplemental Investigation Report 1A-49 Aggregate Area - 1A-14	Supplemental Investigation Report prepared to pair risk assessment with previous investigation results.	12/31/2016							
	2	Supplemental Investigation Report 1A-49 Aggregate Area - Outside HES	Supplemental Investigation Report prepared to pair risk assessment with previous investigation results.	10/31/2016							
Supplemental Investigation Reports (SIR)	8	Supplemental Investigation Report Horn Archon Aggregate Area	Supplemental Investigation Report prepared to pair risk assessment with previous investigation results.	4/30/2017							
	16	Supplemental Investigation Report Lower Sandoz Canyon Aggregate Area	Supplemental Investigation Report prepared to pair risk assessment with previous investigation results.	9/30/2017							
	1A-21 OAD and Cleanup				1A-21 Corrective Actions Field Complete for Consolidated Unit 21-004(B)-99	Field completion of corrective actions for Consolidated Unit 21-004(B)-99.	3/31/2018				
1A-21 OAD and Cleanup				1A-21 WESTBAY WWS Evaluation Reconfiguration Activities Completed for (S-5, R-7, R-8, R-9) and Report Submitted to NMED-HMWB.	Reconfiguration completion report.	3/31/2018					
1A-21 OAD and Cleanup								Following demolition of 1A-21 Building 21-257 (not under Contract Order), initiate the Investigation Work Plan for Building 21-257 Footprint Investigation (used to removal of Old West Industrial Waste Lines).	Completion of Contractor Readiness Review.	4/30/2019	

**Appendix B MILESTONES AND TARGETS**

FY 2017 MILESTONES										FY 2018 TARGETS										FY 2019 TARGETS									
Campaign	Milestone #	Milestone	Milestone Description	Milestone Date	Target	Target Description	Target Date	Target	Target Description	Target Date																			
TA 21 D	7A-21 D&D and Cleanup				7A-21 D&D Phase (DP) Work	One of the few remaining (4) for TA 21.	9/30/2018																						
					Building Footprint Investigations Complete and IR Submitted to NMED-HWIL																								
TA 21 D&D and Cleanup					7A-21 DP East Nubur and Extent Investigation Report Completed and Submitted to NMED-HWIL	It is one of last major investigation reports for TA 21.	9/30/2018																						
RDX Remedy								RDX Remediation Corrective Measures Implementation (CMI) Plan Completed and Submitted to NMED-HWIL	CMI for combining surface and subsurface remedies.	9/30/2019																			
Known Cleanup Sites (Above SSLs)	Known Cleanup Sites (Above SSLs)							Complete Aggregate Area Known Cleanup Campaign	Field completion of cleanups of 20 sites in nine technical areas (from the middle ten aggregate areas investigations) currently known to exceed soil screening levels. These sites include: 03-049(A), 03-049(B), 03-049(C), 14-006, 14-009, 15-007(A&B), 15-008(A), 15-010(A), 16-025(B), 36-001, 36-004, C-36-004, 39-001(A&B), 39-027(A), 39-027(B), 46-004(A), 50-006(A), 53-001(A).	9/30/2019																			
MDAs-A & -T Remedy	MDAs-A & -T Remedy				Supplement Investigation Work Plan for the Pits and Trenches at MDA-A Submitted to NMED-HWIL	This supplemental investigation work plan will provide for the collection of information necessary to complete the characterization for future and extent of contamination at MDA-A and to develop a future corrective measures evaluation in order to recommend an appropriate remedy. A Documented Safety Analysis (DSA) will be required and if so, may extend date significantly.	9/30/2018	MDA-A Measure Monitoring Completion and Report Submitted to NMED-HWIL	Installation of test observation of boroholes, application of water to borered area, monitoring of moisture at boroholes, and development of completion report for activity.	9/30/2019																			
Chromium Final Remedy	Chromium Final Remedy							Chromium Source Control Corrective Measures Implementation (CMI) Plan completed and submitted to NMED-HWIL	This implementation plan addresses the implementation of the Chromium remedy selected by NMED. (Date is dependent on the NMED development of a statement of basis.)	6/30/2019																			
Southern External Boundary	Southern External Boundary							Chaquehat Canyon Aggregate Area Investigation Report Completed and Submitted to NMED-HWIL	Final investigations and development of IR for one of the southern canyons. This is a low priority campaign but should be paired with South Ancho as geophysical proximity warrants pairing.	3/31/2019																			

Appendix B MILESTONES AND TARGETS

		FY 2017 MILESTONES				FY 2018 TARGETS			FY 2019 TARGETS		
Region	Campaign	Milestone #	Milestone	Milestone Description	Milestone Date	Target	Target Description	Target Date	Target	Target Description	Target Date
Southern Exp	Southern External Boundary								Investigation Report for South	Initial Investigation Report for this aggregate area and the requisite risk assessment. This would include cleanups for media above SLL.	12/31/2019
									Ando Canyon Aggregate Area		
MDA-C Remedy	MDA-C Remedy										
Sandia Canyon Watershed	Sandia Canyon Watershed	9	Sandia Canyon Watershed Performance Report for Period April 2015 - December 2016 (2017)	Annual inspection report describing activities performed in canyon to stabilize headcutting in the wetland that is keeping trivalent chromium entrained.	4/30/2017	Sandia Canyon Watershed Performance Report for Period April 2017 - December 2017 (2018)	Annual inspection report describing activities performed in canyon to stabilize headcutting in the wetland that is keeping trivalent chromium entrained.	6/30/2018	Sandia Canyon Watershed Performance Report for Period April 2018 - December 2018 (2019)	Annual inspection report describing activities performed in canyon to stabilize headcutting in the wetland that is keeping trivalent chromium entrained.	6/30/2019
Pajarito Watershed	Pajarito Watershed					Initial Investigation of Trivalent Chromium Aggregate Area and substantial of Investigation Report to HHEID-HMMA	This build on field sampling activity that may occur in FY2017 (but is not planned as of 3/31/2016) and development of the report and risk assessment in FY2018.	9/30/2018			
Upper Water Watershed	Upper Water Watershed										
MDA-AB Remedy	MDA-AB Remedy										
MDA-H Remedy	MDA-H Remedy										
MDAs-G & -L Remedies	MDAs-G & -L Remedies										
			15					13			11

APPENDIX C  
FUTURE CAMPAIGNS

## Appendix C – Future Campaigns

The following sections list and describe the campaigns expected to be performed at LANL. The campaigns listed below will complete the work scope under the Consent Order.

### A. Chromium Interim Measures and Characterization Campaign – in progress

This campaign includes installation and operation of wells and associated equipment necessary to meet three primary objectives: 1) provide interim measures to prevent migration of the plume beyond the Laboratory boundary; 2) perform scientific studies and aquifer testing to obtain data necessary to conduct a corrective measures evaluation; and 3) conduct a corrective measures evaluation. This is an approximately 2-3 year campaign (remaining). (SWMUs/AOCs: 1)

### B. Historical Properties Completion Campaign – in progress

This campaign involves additional investigation and remediation as necessary for: 1) sites located in the historical location of the Laboratory and 2) former Laboratory properties that were transferred and are private properties or that require access through private property. This is an approximately 15 month campaign (remaining). (SWMUs/AOCs: 84)

- Rendija Canyon Aggregate Area<sup>1</sup> Munitions controls and asphalt removal (SWMUs/AOCs: 0 without CoCs)
- Pueblo Canyon Aggregate Area Phase II submit requests for certificates of completion (SWMUs/AOCs: 7)
- Upper Los Alamos Canyon Aggregate Area cleanups and Phase II IR (SWMUs/AOCs: 31)
- Middle Los Alamos Canyon Aggregate Area PCB cleanup at AOC 02-011(a), ECORisk studies, and Phase II IR (SWMUs/AOCs: 46)

### C. Royal Demolition Explosives (RDX) Characterization Campaign – in progress

This campaign includes: 1) potential interim measures or surface activities to prevent further migration of RDX and 2) characterization of the intermediate/regional groundwater through well installation, tracer studies and source control necessary to conduct a corrective measures evaluation. This is an approximately 2 year campaign (remaining). (SWMUs/AOCs: 2)

### D. Supplemental Investigation Reports Campaign – in progress

This campaign includes preparation and submission of ten supplemental investigation reports and, where appropriate, submission of requests for Certificates of Completion. Previous investigations were conducted for ten aggregate areas and the results were reported in Investigation Reports (IR). Following submittal of these IRs, NMED updated its position on defining nature and extent of contamination. Therefore, the data for

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<sup>1</sup> For purposes of Appendix C, “aggregate area” means an area within a single watershed or canyon made up of one or more SWMUs or AOCs and the media affected or potentially affected by releases from those SWMUs or AOCs, and for which investigation or remediation, in part or in entirety, is conducted for the area as a whole in order to address area-wide contamination, ecological risk assessment, and other factors.

aggregate areas, where IRs have already been submitted, will be reassessed to determine if that data documents the nature and extent of contamination for SWMUs and AOCs in each of the ten aggregate areas and whether each SWMU or AOC poses an unacceptable risk to human health and the environment. This is an approximately 15 month campaign (remaining). These aggregate areas include the following:

- S-Site Aggregate Area. (Submitted) (SWMUs/AOCs: 62)
- Potrillo and Fence Canyons Aggregate Areas. (Submitted) (SWMUs/AOCs: 15)
- Threemile Canyon Aggregate Area. (Submitted) (SWMUs/AOCs: 19)
- TA-49 Inside the Nuclear Environmental Site Boundary. (SWMUs/AOCs: 9)
- TA-49 Outside the Nuclear Environmental Site Boundary. (SWMUs/AOCs: 3)
- Cañon de Valle TA-14. (SWMUs/AOCs: 20)
- North Ancho Canyon Aggregate Area. (SWMUs/AOCs: 2)
- Lower Sandia Canyon Aggregate Area. (SWMUs/AOCs: 16)
- Upper Cañada del Buey Aggregate Area (SWMUs/AOCs: 48)
- Mortandad Canyon Aggregate Area (Submitted) (SWMUs/AOCs: 28)

E. TA-21 D&D and Cleanup Campaign – in progress

This campaign includes the removal and remediation of buried waste lines and contaminated soils to be performed as part of the DP Site Aggregate Area investigation. Demolition of facilities and slabs are not part of the Consent Order and will be executed under DOE requirements; the facilities to be demolished include the DP West slabs and the Radiological Liquid Waste Treatment Facility, TA-21-257, enabling access to the SWMUs and AOCs. (SWMUs/AOCs: 41)

F. RDX Remedy Campaign

Building on the RDX Characterization Campaign, following NMED's statements of basis and selection of a remedy, this campaign includes implementation of the remedy. This is potentially a 2-3 year campaign. (SWMUs/AOCs: 0)

G. Known Cleanup Sites (Above SSLs) Campaign

This campaign includes soil removal from twenty sites that previous investigations identified have hazardous contaminants at concentration that exceed the target risk levels of  $10^{-5}$  lifetime excess cancer risk for carcinogenic Contaminants and a hazard index (HI) of 1 for non-carcinogenic Contaminants. This is an approximately 15 month campaign. (SWMUs/AOCs: 20)

H. Material Disposal Areas A and T Remedy Campaign (MDAs –A & -T Remedy)

This campaign includes completion of additional characterization of the pit and trench wastes at MDA-A and performance of moisture monitoring at MDA-T including installation of instrumentation of boreholes, application of water to bermed area, and monitoring of boreholes for moisture to conduct corrective measures evaluations for both MDA-A and MDA-T. These CMEs will result in NMED's statements of basis and selections of a remedy, and then the campaign will implement the remedies. This is an approximately 5 year campaign – excluding implementation (which might be another 2-3 years). (SWMUs/AOCs: 26 SWMUs (plus 1 for MDA-A and 3 for MDA-T))

I. Chromium Final Remedy Campaign

Building on the Chromium IM and Characterization Campaign, following NMED's statements of basis and selection of a remedy, this campaign includes implementation of the remedy. This is potentially a 4-5 year campaign. (SWMUs/AOCs: 0)

J. Southern External Boundary Campaign

This campaign includes, as appropriate, initial investigations, remediation of media above soil screening levels, risk assessments, and certificates of completion for three aggregate areas. Aggregate Areas have generally been investigated from north to south across the Laboratory. These three areas are in the border area between the Laboratory, Bandelier, and White Rock populated areas. This is an approximately 2-1/2 year campaign. This campaign shall be conducted in the following areas (SWMUs/AOCs: 60):

- Chaquehui Canyon Aggregate Area Initial Investigation
- South Ancho Canyon Aggregate Area Initial Investigation
- Lower Water Canyon Aggregate Area Initial Investigation
- North Ancho Canyon Aggregate Area Phase II
- Potrillo/Fence Canyon Aggregate Area Phase II

K. Material Disposal Area C Remedy Campaign (MDA-C Remedy)

This campaign includes implementation of a remedy resulting from NMED's statement of basis and selection of a remedy derived from a corrective measure evaluation previously submitted. This campaign will include development of a corrective measures implementation plan, implementation of the remedy, and development of the corrective measures report. This is an approximately 4 year campaign. (SWMUs/AOCs: 1)

L. Sandia Canyon Watershed Campaign

This campaign includes completion of several investigations that are already in progress in the central portion of the Laboratory for certain Aggregate Areas. This is an approximately 2-year campaign, and it includes the following (SWMUs/AOCs: 49):

- Upper Sandia Canyon Aggregate Areas Phase II Investigations
- Lower Sandia Canyon Aggregate Areas Phase II Investigations
- Upper Mortandad Canyon Aggregate Area Phase II Investigation
- Upper Cañada del Buey Aggregate Area Phase II Investigation

M. Pajarito Watershed Campaign

This campaign includes initial investigations in some Aggregate Areas for which investigation has not yet occurred as well as completion of those investigations that are already in progress for other Aggregate Areas in the central portion of the Laboratory. For these areas, this campaign includes remediation, as appropriate, for media above soil screening levels. This is an approximately 2-1/2 year campaign that includes the following (SWMUs/AOCs: 167):

- Starmer/Upper Pajarito Canyon Aggregate Area Initial Investigation

- Twomile Canyon Aggregate Area Initial Investigation
- Threemile Canyon Aggregate Area Phase II Investigation
- Lower Pajarito Canyon Aggregate Area Initial Investigation

N. Upper Water Watershed Campaign

This campaign includes initial investigations in some Aggregate Areas for which investigation has not yet occurred as well as completion of those investigations that are already in progress for other Aggregate Areas. For these areas, this campaign includes remediation, as appropriate, for media above soil screening levels. This is an approximately 2-1/2 year campaign that includes the following (SWMUs/AOCs: 253):

- Cañon de Valle TA-15 Initial Investigation
- Cañon de Valle TA-16 Initial Investigation
- Cañon de Valle TA-14 Phase II Investigation
- Upper Water Canyon Aggregate Area Initial Investigation
- S-Site Canyon Aggregate Area Phase II Investigation

O. Material Disposal Area AB Remedy Campaign (MDA-AB Remedy)

This campaign includes additional characterization of the shaft areas inside and outside of the Nuclear Environmental Site (NES) boundary and completion of the corrective measures evaluation. Following NMED's statement of basis and selection of a remedy, this campaign includes development of a corrective measures implementation plan, implementation of the remedy, and development of the corrective measures report. This is an approximately 4 year campaign. (SWMUs/AOCs: 12; included in SIR)

P. Material Disposal Areas H Remedy Campaign (MDA-H Remedy)

Following NMED's statement of basis and selection of a remedy, this campaign includes development of a corrective measures implementation plan, implementation of the remedy, and development of the corrective measures report. This is an approximately 4 year campaign. (SWMUs/AOCs: 1)

Q. Material Disposal Areas G and L Remedy Campaign (MDAs-G & -L Remedy)

Following NMED's statements of basis and selection of a remedy for MDA-L and MDA-G, this campaign includes development of a corrective measures implementation plans, implementation of the remedies, and development of the corrective measures reports. This campaign will also perform soil vapor extraction (SVE) of volatile organic compounds as an interim measure while an asphalt cover still exists above MDA-L. This interim measure will address a subsurface vapor plume that is relatively shallow and has not yet progressed towards the basalt layer above the water table. This is an approximately 5 year campaign. (SWMUs/AOCs: 12)

APPENDIX D  
DOCUMENT REVIEW/COMMENT AND REVISION  
SCHEDULE

## APPENDIX D

### DOCUMENT REVIEW/COMMENT AND REVISION SCHEDULE

<u>Document</u>	<u>Activity</u>	<u>Period (days)</u>
RFI Work Plan	NMED Review	90
	DOE Revise	60
RFI Report (w/ Risk Assessment)	NMED Review	120
	DOE Revise	90
Interim Measures Work Plan	NMED Review	90
	DOE Revise	60
Interim Measures Report	NMED Review	120
	DOE Revise	90
Remedy Implementation Plan	NMED Review	150
	DOE Revise	90
Remedy Completion Report	NMED Review	180
	DOE Revise	90
CME Report	NMED Review	280
	DOE Revise	150
CMI Plan	NMED Review	210
	DOE Revise	120
Accelerated Corrective Action Report	NMED Review	120
	DOE Revise	90
Certificates of Completion	NMED Review	120
	DOE Revise	60
Area of Contamination Request	NMED Review	30
	DOE Revise	30

APPENDIX E  
EXAMPLE DOCUMENT TEMPLATES

## **I) General**

This Appendix (E) provides NMED's general expectations and guidance for reporting and document formats for corrective action documents under this Consent Order. The described formats include the general reporting recommendations and formats for site-specific RCRA Facility Investigation (RFI) work plans, RFI reports, periodic monitoring reports, risk assessment reports, corrective measures evaluations (CME), corrective measures implementation plans (CMIP), and corrective measures implementation reports (CMIR). This Appendix is not intended to provide recommended reporting formats for every potential corrective action document prepared under this Consent Order. Additionally, the recommendations for reporting and format of documents listed in this Appendix (E) may not include all sections that may be necessary to complete each type of document listed. Either Party may determine that additional sections are needed to address additional site-specific issues or information collected during corrective action or monitoring activities not listed below. Sections that do not apply to a particular plan or report may be omitted from that document.

## **II) RCRA Facility Investigation (RFI) Work Plan**

DOE should prepare work plans for site investigations or corrective action activities using the general outline below. The data quality objectives (e.g., define nature and extent of contamination) should be clearly stated and the research, locations, depths and schedules of proposed sampling should be included in the work plan. General descriptions of proposed methods of exploration, field procedures and data collection methods should be included in each work plan. The general work plan outline is described below.

As appropriate, information described below related to previous investigations may be presented in a Historical Investigation Report prepared in conjunction with the RFI work plan.

### **a) Title Page**

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

### **b) Signature Block**

A signature block providing spaces for the name and title of the responsible representatives should be provided.

### **c) Executive Summary (Abstract)**

The executive summary or abstract should provide a brief summary of the purpose and scope of the investigation to be conducted at the subject site. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

#### d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the work plan. The corresponding page numbers for the titles of each section of the work plan should be included in the table of contents.

#### e) Introduction

The introduction should include the Facility name, TA designation, unit location, and unit status. General information on the current site usage and status should also be included in this section. A brief description of the purpose of the investigation and the type of site investigation to be conducted should be provided in this section.

#### f) Background

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

This section should identify potential receptors, (e.g., groundwater), and include a brief summary of the type and characteristics of all waste and all Contaminants managed or released at the site, the known and possible sources of contamination, the history of releases or discharges of contamination, and the known extent of contamination. This section should include brief summaries of results of previous investigations including references to pertinent figures, data summary tables, and text in previous reports. At a minimum, detections of Contaminants encountered during previous investigations should be presented in table format, with an accompanying figure showing sample locations. If references to previous reports are presented, they should include page, table, and figure numbers for referenced information. Summary data tables and a site plan showing relevant investigation locations should be included in the Tables and Figures sections of the document, respectively.

For work plans addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs or AOCs), the information described in this section may be presented in TA-specific and/or site-specific background sections.

#### g) Site Description

##### i) Surface Conditions

A section on surface conditions should describe current and historical site topography, features and structures including topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a detailed description of current site uses and operations. In addition, descriptions of features located in surrounding sites that may have an

impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport should be included in this section.

#### ii) Subsurface Conditions

A section on subsurface conditions should the site conditions observed during previous subsurface investigations. It should include relevant soil horizons, stratigraphic information, groundwater conditions, and subsurface vapor information. A site plan showing the locations of all borings and excavations advanced during previous investigations should be included in the Figures section. A brief description of the anticipated stratigraphic units that may be encountered during the investigation may be included in this section if no previous investigations have been conducted at the site.

#### h) Proposed Investigation Activities

A section on proposed investigation activities should describe the data quality objectives of the proposed work scope as well as briefly describe a list of anticipated activities to be performed during the investigation to meet the data quality objectives. This could include background information research, health and safety requirements that may affect or limit the completion of tasks, drilling, test pit or other excavations, well construction, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot tests, and investigation-derived waste (IDW) storage and disposal. IDW includes general refuse, drill cuttings, excess sample material, water (decontamination, development and purge), and disposable equipment generated during the course of investigation, corrective action, or monitoring activities.

For work plans addressing multiple sites, the information described in this section may be presented in site-specific sections.

#### i) Investigation Methods

A section on investigation methods should provide a description of anticipated locations and methods for conducting the activities intended to achieve the data quality objectives. This section could include research methods, health and safety practices that may affect the completion of tasks, drilling methods, test pit or other excavation methods, sampling intervals and methods, well construction methods, field data collection methods, geophysical and land survey methods, field screening methods, chemical analytical testing, materials testing, aquifer testing, pilot tests, and other proposed investigation and testing methods. This information may also be summarized in table format, if appropriate.

#### j) Monitoring and Sampling Program

A section on monitoring and sampling should provide a description of the groundwater, ambient air, subsurface vapor, remediation system, engineering controls, and other monitoring and sampling programs currently being implemented at the site.

#### k) Schedule

A section should set forth the anticipated schedule for completion of field investigation, pilot testing, and monitoring and sampling activities. In addition, this section should set forth a schedule for submittal of reports and data to NMED.

#### l) References and Map Data Sources

A section should provide a reference list of all documents cited in the RFI work plan. The sources of geospatial data used to develop maps and figures presented in the RFI work plan should also be provided.

#### m) Tables

All tables should be provided in this section of the report. The following summary tables may be included in the investigation work plans, if applicable and if previous investigations have been conducted at the site. Data presented in the tables should include information on dates of data collection, analytical methods, detection limits, and significant data quality exceptions. The summary analytical data tables should include only detected analytes and data quality exceptions that could potentially mask detections.

1. Tables summarizing regulatory criteria, background, and applicable cleanup levels (may be included in the analytical data tables instead of as separate tables).
2. Tables summarizing historical field survey location data.
3. Tables summarizing historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
4. Tables summarizing historical soil, rock, and sediment laboratory analytical data should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
5. Tables summarizing historical groundwater elevation and depth to groundwater data. The table should include the monitoring well depths, the screened intervals in each well, and the dates and times measurements were taken.
6. Tables summarizing historical groundwater laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
7. Tables summarizing historical surface water laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
8. Tables summarizing historical air sample screening and laboratory analytical data. The data tables should include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
9. Tables summarizing historical pilot or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.

#### n) Figures

All figures should be provided in this section of the report. This section should include the following figures, including presentation of data where previous investigations have been conducted. All figures should include an accurate bar scale and a north arrow. An explanation should be included on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps should contain a date of preparation.

1. A vicinity map showing topography and the general location of the site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting historical and proposed soil boring or excavation locations and sampling locations.
4. Figures presenting historical soil sample field screening and laboratory analytical data.
5. Figures presenting the locations of all existing and proposed vapor monitoring wells and borings.
6. Figures presenting all existing and proposed groundwater monitoring wells and piezometers, historical groundwater elevation data, and groundwater flow directions.
7. Figures presenting historical groundwater laboratory analytical data, if applicable. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
8. Figures presenting historical and proposed surface water sample locations and field measurement data, if applicable.
9. Figures presenting historical surface water laboratory analytical data, if applicable.
10. Figures presenting historical and proposed air sampling locations and presenting historical air quality data.
11. Figures presenting historical pilot and other testing locations and data, where applicable, including site plans and graphic data presentation.
12. Figures presenting geologic cross-sections, based on outcrop and borehole data acquired during previous investigations.

#### o) Appendices

A description of IDW management should be included as an appendix to the investigation work plan. Additional appendices may be necessary to present additional data or documentation not listed above.

### **III) RCRA Facility Investigation (RFI) Report**

DOE should prepare investigation reports at the Facility using the general outline below. The RFI Report should be the reporting mechanism for presenting the results of completed RFI Work Plans. This section describes recommendations for reporting on SWMU and AOC investigations.

#### **a) Title Page**

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

#### **b) Signature Block**

A signature block providing spaces for the name and title of the responsible representatives should be provided.

#### **c) Executive Summary (Abstract)**

The executive summary or abstract should provide a brief summary of the purpose, scope, and results of the investigation. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary. In addition, this section should include a brief summary of conclusions based on the investigation data collected and recommendations for future investigation, monitoring, remedial action or site closure.

#### **d) Table of Contents**

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

#### **e) Introduction**

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the investigation, the type of site investigation conducted, and the type of results presented in the report also should be provided in this section.

#### **f) Background**

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

In addition, this section should include a brief summary of known and possible sources of contamination, the history of releases or discharges of contamination, the known extent of contamination, and the results of previous investigations including references to pertinent figures, data summary tables, and text in previous reports. The references to previous reports should include page, table, and figure numbers for referenced information. Summary data tables and a site plan showing relevant investigation locations should be included in the Tables and Figures sections of the document, respectively.

For investigation reports addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs/AOCs), the information described in this section may be presented in TA-specific or site-specific background sections.

g) Site Description

i) Surface Conditions

A section on surface conditions should describe current site topography, features, and structures including topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a description of current site uses and operations.. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport should be included in this section.

A section should describe surface water conditions and include a description of surface water runoff, drainage, surface water sediment transport, and contaminant transport in surface water as suspended load and as a dissolved phase in surface water via natural and man-made drainages, if applicable. A description of contaminant fate and transport should be included, if appropriate.

ii) Subsurface Conditions

A section on subsurface conditions should describe known subsurface lithology and structures, based on observations made during the current and previous subsurface investigations, including interpretation of geophysical logs and as-built drawings of man-made structures. A description of any known locations of pipelines and utility lines and observed geologic structures should also be included in this section. A site plan showing boring and excavation locations and the locations of the site's above- and below-ground structures should be included in the Figures section of the report. In addition, cross-sections should be constructed, if appropriate, to provide additional visual presentation of site or regional subsurface conditions.

A section should describe groundwater conditions observed beneath the subject site and relate local groundwater conditions to regional groundwater conditions. A description of the depths to water, aquifer thickness, and groundwater flow directions should be included in this section for alluvial groundwater, shallow perched groundwater, intermediate perched groundwater, and regional groundwater, as appropriate to the investigation. Figures showing well locations, surrounding area, and groundwater elevations and flow directions for each hydrologic zone should be included in the Figures section of the report.

#### h) Investigation Activities

A section on the investigation activities should briefly describe all activities performed during the investigation. This could include background information research, implemented health and safety measures that affected or limited the completion of tasks, drilling, test pit or other excavation methods, well construction methods, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot tests, and IDW storage and disposal. Any deviations from the approved RFI work plan should be identified.

#### i) Regulatory Criteria

A section should set forth the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium and exposure scenario at the subject site. The appropriate cleanup standards or screening levels for each site should be included if site-specific levels have been established at the subject site. A table summarizing the applicable cleanup standards or screening levels, or inclusion of applicable cleanup standards or screening levels in the data tables, should be included in the Tables section of the document. The risk assessment, if conducted, should be presented in a separate document or in an appendix to this report. If cleanup standards or screening levels calculated in an NMED-approved risk evaluation are employed, the risk evaluation document should be referenced including pertinent page numbers for referenced information.

#### j) Data Review Methodology

##### i) Identification of COPCs

A section should describe the process for evaluating investigation data to identify chemicals of potential concern (COPCs). The process should include, as appropriate, comparisons of site data to background values and background data, statistical tests using site data and background data, and evaluation of site history concerning use and release of chemicals at the site.

##### ii) Extent of Contamination

A section should describe the process for evaluating each COPC to determine whether extent of contamination has been defined. The process should consider the spatial distribution and trends of COPC concentrations. If extent is not defined, the process should determine whether additional sampling to determine extent is warranted based on comparisons to risk-based screening levels.

#### k) Field Investigation Results

A section should provide a summary of the procedures used and the results of all field investigation activities conducted at the site including the dates that investigation activities were conducted, the type and purpose of field investigation activities performed, field screening measurements, logging and sampling results, pilot test results, construction details, and conditions observed. Field observations or conditions that altered the planned work or may have influenced the results of sampling, testing, and logging should be reported in this section.

For investigation reports addressing multiple technical areas (TAs) and/or multiple sites (i.e., SWMUs/AOCs), the information described in this section may be presented in TA-specific or site-specific investigation result sections.

#### i) Site Contamination

A section should provide a description of sampling intervals and methods for detection of surface and subsurface contamination in soils, rock, sediments, groundwater, and surface water, and as vapor-phase contamination. Only factual information should be included in this section. Interpretation of the data should be reserved for the summary and conclusions sections of the report. Tables summarizing all sampling, testing, and screening results for detected Contaminants should be prepared in a format approved by NMED. The tables should be presented in the Tables section of the report.

##### (1) Soil, Rock, and Sediment Sampling

A section should describe the sampling of soil, rock, and sediment. It should include the dates, locations and methods of sample collection; sampling intervals; sample logging methods; screening sample selection methods; and laboratory sample selection methods including the collection depths for samples submitted for laboratory analyses. A site plan showing the sample locations should be included in the Figures section of the report.

##### (2) Soil, Rock, and Sediment Sample Field Screening Results

A section should describe the field screening methods used during the investigation and the field screening results. Field screening results also should be presented in summary tables in the Tables section of the document. The limitations of field screening instrumentation and any conditions that influenced the results of field screening should be discussed in this subsection.

##### (3) Soil, Rock, and Sediment Sampling Analytical Results

A section should summarize the results of laboratory analysis for soil, rock, and sediment samples. It should also describe the analytical methods used and provide a comparison of the analytical results to media-specific background values and screening levels for applicable exposure scenarios. The laboratory results also should be presented in summary tables in the Tables section of the document. Field conditions and sample collection methods that could potentially affect the analytical results should be described in this section. If appropriate, soil analytical data should be presented with sample locations on a site plan and included in the Figures section of the report.

Analytical results should be evaluated using the process described in the Data Review Methodology section. Analytical results should be evaluated to identify COPCs. The lateral and vertical extent of contamination should be evaluated for each COPC to determine if extent is defined and, if not, whether additional sampling is warranted.

#### (4) Groundwater Sampling

A section on groundwater sampling should describe the dates, locations, depths, and methods of sample collection; methods for sample logging; and methods for screening and laboratory sample selection. A map showing all site and surrounding area well locations should be included in the Figures section of the report.

#### (5) Groundwater General Chemistry

A section on the general groundwater chemistry should describe the results of measurement of field purging parameters and field analytical measurements. Field parameter measurements and field analytical results also should be presented in summary tables in the Tables section of the document. The limitations of field measurement instrumentation and any conditions that may have influenced the results of field screening should be discussed in this section. As determined by DOE and NMED, relevant water chemistry concentrations should be presented as data tables or as isoconcentration contours on a map included in the Figures section of the report.

#### (6) Groundwater Chemical Analytical Results

A section should summarize the results of groundwater chemical analyses. It should describe the groundwater chemical analytical methods and analytical results. It should also provide a comparison of the data to cleanup standards or established cleanup levels for the site. The rationale or purpose for altering or modifying the groundwater sampling program outlined in the site RFI work plan should also be provided as appropriate in this section. Field conditions should be described in this section that may have affected the analytical results during sample collection. Tables summarizing the groundwater laboratory, field, and field sample QA/QC chemical analytical data; applicable cleanup levels; and modifications to the groundwater sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations, data tables, or as isoconcentration contours on a map included in the Figures section of the report.

#### (7) Surface Water Sampling

A section should describe the surface water sampling and should include the dates, times, locations, depths, and methods of sample collection. It should also describe methods for sample logging, sample-screening methods, and laboratory sample selection methods. A map showing all surface-water sampling locations should be included in the Figures section of the report.

#### (8) Surface Water General Chemistry

A section on the surface water general chemistry should describe the results of measurement of field parameters and field analytical measurements. Field parameter measurements and field analytical results also should be presented in summary tables in the Tables section of the document. The limitations of field measurement instrumentation and any conditions that influenced the results of field screening should be discussed in this section. Relevant water chemistry concentrations should be presented as data tables on a map included in the Figures section of the report.

### **(9) Surface Water Chemical Analytical Results**

A section should summarize the results of surface water chemical analyses. It should describe the analytical methods and analytical results, and provide a comparison of the data to the cleanup standards or established background or cleanup levels for the site. The rationale or purpose for altering or modifying the surface-water sampling program outlined in the site RFI work plan also should be provided as appropriate in this section. Field conditions that may have affected the analytical results during sample collection should be described in this section. Tables summarizing the surface water laboratory, field, and analytical field sample QA/QC analytical data; applicable cleanup levels; and modifications to the surface-water sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations or as data tables on a map included in the Figures section of the report.

### **(10) Air and Subsurface Vapor Sampling**

A section should describe the air and subsurface vapor sampling. It should describe the dates, locations, depths or elevations above ground surface, methods of sample collection, methods for sample logging, and methods for laboratory sample selection. A map showing all air sampling locations should be provided in the Figures section of the report.

### **(11) Air and Subsurface Vapor Field Screening Results**

A section should describe the air and subsurface vapor field screening results. It should describe the field screening methods used for ambient air and subsurface vapors during the investigation and the field screening results. Field screening results should also be presented in summary tables in the Tables section of the report. The locations of ambient air and subsurface vapor screening sample collection should be presented on a site plan included in the Figures section of the report. The limitations of field screening instrumentation and any conditions that influenced the results of field screening should be discussed in this section.

### **(12) Air and Subsurface Vapor Laboratory Analytical Results**

A section should describe the results of air and subsurface vapor laboratory analysis. It should describe the air sampling laboratory analytical methods and analytical results, and provide a comparison of the data to emissions standards or established cleanup or emissions levels for the site. The rationale or purpose for altering or modifying the air monitoring or sampling program outlined in the site investigation work plan also should be provided as appropriate in this section. Field conditions that may have affected the analytical results during sample collection should be described in this section. Tables summarizing the air sample laboratory, field, and analytical field sample QA/QC data; applicable cleanup levels or emissions standards; and modifications to the air sampling program should be provided in the Tables section of the report. Relevant contaminant concentrations should be presented as individual analyte concentrations, data tables, or as isoconcentration contours on a map included in the Figures section of the report.

## ii) Summary of Human Health Risk Screening

As applicable, a section should summarize the results of the human health risk screening presented in the Risk Assessments appendix.

## iii) Summary of Ecological Risk Screening

As applicable, a section should summarize the results of the ecological risk screening presented in the Risk Assessments appendix.

## l) Conclusions

A section should provide a brief summary of the investigation activities and results and a discussion of the conclusions of the investigation conducted at the site. The purpose of the conclusions is to support the recommendations for each site. The conclusions should address whether nature and extent of contamination are defined for each site and whether additional sampling for extent is warranted. The conclusions should also address whether each site poses an unacceptable risk to human health and ecological receptors for the exposure scenarios evaluated.

## m) Recommendations

A section should discuss the need for further investigation, corrective measures, risk assessment and monitoring, or recommendations for corrective action completed, based on the conclusions provided in the Conclusions section. It should include explanations regarding additional sampling, monitoring, and site closure. A corresponding schedule for further action regarding the site should also be provided.

## n) References and Map Data Sources

A section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

## o) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the following tables. The summary analytical data tables should include only inorganic Contaminants detected above background values, detected without background values, or not detected with detection limits above background values and detected organic Contaminants.

1. Tables summarizing regulatory criteria, background levels, and applicable cleanup levels (this information may be included in the analytical data tables instead of as separate tables).
2. Tables summarizing field survey location data. Separate tables should be prepared for well locations and individual medium sampling locations except where the locations are the same for more than one medium.

3. Tables summarizing field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
4. Tables summarizing soil, rock, and/or sediment laboratory analytical data.
5. Tables summarizing the groundwater elevations and depths to groundwater. The table should include the monitoring well depths and the screened intervals in each well, and the dates and times measurements were taken.
6. Tables summarizing groundwater laboratory analytical data.
7. Tables summarizing surface water laboratory analytical data.
8. Tables summarizing the air sample screening and laboratory analytical data.
9. Tables summarizing the pilot test data, if applicable, including units of measurement and types of instruments used to obtain measurements.
10. Tables summarizing any materials test data.

p) Figures

All figures should be provided in this section of the report. This section should provide the following figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps should contain a date of preparation.

1. A vicinity map showing topography and the general location of the site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be required to present the locations of relevant off-site well locations, structures and features.
3. Figures presenting boring or excavation locations and sampling locations.
4. Figures presenting soil sample field screening (if applicable) and laboratory analytical data.
5. Figures presenting the locations of all newly installed and existing vapor monitoring wells and borings.
6. Figures presenting groundwater monitoring well and piezometer locations, groundwater elevation data, and groundwater flow directions.
7. Figures presenting groundwater laboratory analytical data. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
8. Figures presenting surface water sample locations and field measurement data.

9. Figures presenting surface water laboratory analytical data. The laboratory analytical data corresponding to each sampling location may be presented in table form on the figure.
10. Figures presenting air sampling locations and presenting air quality. The field screening or laboratory analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map.
11. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.
12. Figures presenting pilot test locations and data, if applicable, including site plans and graphic data presentation.

q) Appendices

Each investigation report should include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

i) Field Methods

An appendix should provide detailed descriptions of the methods used to acquire field measurements of each medium that was surveyed or tested during the investigation. This appendix should include exploratory drilling or excavation methods, the methods and types of instruments used to obtain field screening, field analytical or field parameter measurements, instrument calibration procedures, sampling methods for each medium investigated, decontamination procedures, sample handling procedures, documentation procedures, abandonment procedures for wells/boreholes and excavations, and a description of field conditions that affected procedural or sample testing results. Methods of measuring and sampling during pilot tests should be reported in this appendix, if applicable. Geophysical logging methods should be discussed in a separate appendix. IDW storage and disposal methods and documentation should be discussed in a separate appendix. Any deviations from the approved RFI work plan should be identified and discussed.

i) Exploratory Drilling or Excavation Investigations

A section should describe the locations, methods, and depths of subsurface explorations. The description should include the types of equipment used, the logging procedures, the soil or rock classification system used to describe the observed materials, exploration equipment decontamination procedures, and conditions encountered that may have affected or limited the investigation.

A description of the site conditions observed during subsurface investigation activities should be included in this section, including soil horizon and stratigraphic information. Site plans showing the locations of all borings and excavations should be included in the Figures section of the report. Boring and test pit logs for all exploratory borings and test pits should be presented in an appendix or attachment to the report.

#### ii) Exploratory and Monitoring Well Boring Geophysical Logging

A section should describe the methods, dates of measurement, depth intervals measured, and the results of geophysical logging. The relative merits and limitations of each geophysical logging method employed should be discussed, along with any field conditions or instrument malfunctions that occurred that may have affected the results of the geophysical logging.

#### iii) Monitoring Well Construction and Boring or Excavation Abandonment

A section should describe the methods and details of monitoring well construction and the methods used to abandon or backfill exploratory borings and excavations. The description should include the dates of well construction, boring abandonment, or excavation backfilling. In addition, well construction diagrams should be included in an appendix or attachment with the associated boring logs for monitoring well borings. The Respondents may submit well abandonment reports as an appendix to the investigation report.

#### iv) Surface Air and Subsurface Vapor Conditions

A section should describe surface air and subsurface vapor monitoring and sampling methods used during the site investigation. It should also describe observations made during the site investigation regarding subsurface flow pathways and the subsurface air-flow regime.

#### v) Materials Testing Results

A section should discuss the materials testing results, such as core permeability testing, grain size analysis, or other materials testing results. Sample collection methods, locations, and depths should also be included. Corresponding summary tables should be included in the Tables section of the report.

#### vi) Pilot Testing Results

A section should discuss the results of any pilot tests. Pilot tests are typically conducted after initial subsurface investigations are completed and the need for additional investigation or remediation has been evaluated. Pilot tests, including aquifer tests and remediation system pilot tests, should be addressed through separate work plans and pilot test reports. The format for pilot test work plans and reports should be approved by the Department prior to submittal.

#### vii) Boring/Test Pit Logs and Well Construction Diagrams

An appendix should provide boring logs, test pit logs, or other excavation logs, and well construction details. In addition, a key to symbols and a soil or rock classification system should be included in this appendix. Geophysical logs should be provided in a separate section of this appendix.

#### viii) Analytical Program

An appendix should discuss the analytical methods, a summary of data quality objectives, and the data quality review procedures. A summary of data quality exceptions and their effect on the

acceptability of the field and laboratory analytical data with regard to the investigation and the site status should be included in this appendix.

**ix) Analytical Reports**

An appendix should provide the contract laboratory final analytical data reports generated for the investigation. The reports should include all chain-of-custody records and Level II QA/QC results provided by the laboratory. The final laboratory reports and data tables should be provided electronically in a format. Paper copies (or electronically scanned in PDF format) of all chain-of-custody records should be provided with the reports. Electronic spreadsheets containing all analytical data, including dates of sampling and analysis, analytical methods, and detection limits should also be provided in this appendix, along with summary pivot tables containing all inorganic and organic results for each sample.

**x) Investigation-Derived Waste Management**

An appendix should provide a description of each IDW stream generated during the investigation; the methods used for characterization, storage, and disposal; and available records documenting disposal.

**xi) Box Plots and Statistical Results**

If statistical tests were performed as part of COPC identification, an appendix should provide the results of the statistical tests as well as box plots comparing site investigation data to background data.

**xii) Risk Assessments**

A risk assessment may be included as an appendix to the investigation report; however, the risk assessment should be presented in the Risk Assessment format described in Section V of this Appendix (E).

**xiii) Other Appendices**

Other appendices containing additional information should be included as deemed necessary by NMED or as otherwise appropriate.

**IV) Periodic Monitoring Report**

DOE should use the following guidance for preparing periodic monitoring reports. The reports should present the reporting of periodic groundwater, surface water, vapor, and remediation system monitoring at the Facility. The following sections provide a general outline for monitoring reports, and also provide the minimum requirements for reporting for specific Facility sites, watersheds, and regional monitoring. All data collected during each monitoring and sampling event in the reporting period should be included in the reports.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, watershed, and any other unit name; the monitoring event or reporting period; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

The executive summary or abstract should provide a brief summary of the purpose, scope, and results of the monitoring conducted at the subject site during the reporting period. The Facility, SWMU or AOC name, site name, location, and TA designation, watershed, and monitoring event or reporting period should be included in the executive summary. In addition, this section should include a brief summary of conclusions based on the monitoring data collected.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the monitoring, type of monitoring conducted, the monitoring event or reporting period, and the type of results presented in the report should also be provided in this section.

f) Scope of Activities

A section on the scope of activities should briefly describe all activities performed during the monitoring event or reporting period including field data collection, analytical testing, remediation system monitoring, if applicable, and purge/decontamination water storage and disposal. Methods used should be identified or a reference provided to an approved work plan describing methods. Any deviations from approved work plans should be identified.

g) Regulatory Criteria

A section should provide information regarding applicable cleanup standards, risk-based screening levels and risk-based cleanup goals for each pertinent medium at the subject site consistent with Section IX (Cleanup Objectives and Cleanup Levels) of the Consent Order. A table summarizing the applicable cleanup standards or screening levels, or inclusion of the applicable cleanup standards or screening levels in the data tables should be included in the

Tables section of the document. The appropriate cleanup or screening levels for each site should be included, if site-specific levels have been established at separate sites. Risk-based evaluation procedures, if used to calculate cleanup or screening levels, should either be included as an appendix or attachment or referenced. The specific document and page numbers should be included for all referenced materials.

#### h) Monitoring Results

A section should provide a summary of the results of monitoring conducted at the site. This section should include the dates and times that monitoring was conducted, the measured depths to groundwater, directions of groundwater flow, field air and water quality measurements, contaminant surveys, static pressures, field measurements, and a comparison to previous monitoring results. Field observations or conditions that may influence the results of monitoring should be reported in this section. Tables summarizing vapor-monitoring parameters, groundwater elevations, depths to groundwater measurements, and other field measurements could be substituted for this section. The tables should include all information required in Section m) below.

#### i) Analytical Data Results

This section should discuss the results of the chemical analyses. It should provide the dates of sampling, the analytical methods, and the analytical results. It should also provide a comparison of the data to previous results and to applicable background values and/or screening levels. The rationale or purpose for altering or modifying the monitoring and sampling program should be provided in this section. The tables should include all information required in Section m) below.

#### j) Remediation System Monitoring

This section should discuss the remediation system monitoring. It should summarize the remediation system's capabilities and performance. It should also provide monitoring data, treatment system discharge sampling requirements, and system influent and effluent sample analytical results. The dates of operation, system failures, and modifications made to the remediation system during the reporting period should also be included in this section. A summary table may be substituted for this section. The tables should include all information required in Section m) below.

#### k) Summary and Interpretations

A summary section should provide a discussion and conclusions of the monitoring conducted at the site. In addition, this section should provide a comparison of the results to applicable screening levels, and to relevant historical monitoring and laboratory analytical data. The consistency of current monitoring results with previous results should be summarized. An explanation should be provided with regard to data gaps. A discussion of remediation system performance, monitoring results, modifications, if applicable, and compliance with discharge requirements should be provided in this section. Recommendations and explanations regarding future monitoring, remedial actions, or site closure, if applicable, should also be included in this section.

#### l) References

A section should provide a reference list of all documents cited in the report.

#### m) Tables

All tables should be provided in this section of the report. A section should provide the following summary tables for the media sampled. As appropriate, DOE may combine one or more of the tables. Data presented in the tables should include the current sampling and monitoring data plus data from the three previous monitoring events or, if data from less than three monitoring events is available, data acquired during previous investigations. Remediation system monitoring data also should be presented. The dates of data collection should be included in the tables. Summary tables may be substituted for portions of the text. As appropriate, the tables identified below may be provided as appendixes.

1. Tables summarizing the regulatory criteria, background levels, and applicable cleanup levels may be included in the analytical data tables instead of as separate table.
2. Tables summarizing groundwater elevations and/or depths to groundwater data. The table should include the monitoring well depths, the screened intervals in each well, and the dates and times of measurements.
3. Tables summarizing field measurements of surface water quality data.
4. Tables summarizing field measurements of vapor monitoring data (should include historical vapor monitoring data as described above).
5. Tables summarizing field measurements of groundwater quality data (should include historical water quality data as described above).
6. Tables summarizing vapor sample laboratory analytical data (should include historical vapor sample analytical data as described above).
7. Tables summarizing surface water laboratory analytical data (should include historical surface water analytical data as described above).
8. Tables summarizing groundwater laboratory analytical data (should include historical groundwater analytical data as described above).
9. Tables summarizing remediation system monitoring data, if applicable (should include historical remediation system monitoring data as described above).
10. Tables summarizing analytical results exceeding screening levels or regulatory criteria.
11. Tables summarizing deviations from approved work plans.

#### n) Figures

All figures should be provided in this section of the report. This section should include the following figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures should contain a date of preparation. As appropriate, figures identified below may be provided as appendixes.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features or properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well and piezometer locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be required to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting, as applicable, the locations of piezometer, monitoring and other well locations, groundwater elevation data, and groundwater flow directions.
4. Figures presenting groundwater laboratory analytical data for the current monitoring event and historical monitoring events. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map.
5. Figures presenting surface water sampling locations and laboratory analytical data for the current monitoring period. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels.
6. Figures presenting vapor sampling locations and laboratory analytical data for the current monitoring event. Analytical data for the current event should be presented for each Contaminant exceeding screening levels at more than one location. The analytical data corresponding to each sampling location exceeding screening levels should also be presented as vertical profiles. Analytical data for current and historical events should show concentrations versus time for Contaminants exceeding screening levels. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map.
7. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.

o) Appendices

Each monitoring report should include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

i) Field Methods

If field methods are not described in an approved work plan, an appendix should be provided that includes the methods used to acquire field measurements of groundwater elevations, vapor and water quality data, and vapor, surface water and groundwater samples. It should include the methods and types of instruments used to measure depths to water, air or headspace parameters, flow measurements, and water quality parameters. In addition, decontamination, well purging

techniques, well sampling techniques, and sample handling procedures should be provided in this appendix. Methods of measuring and sampling remediation systems should be reported in this section, if applicable.

#### ii) Analytical Reports

An appendix should provide the analytical reports and include the contract laboratory final chemical analytical data reports generated during this reporting period. The reports should include all chain-of-custody records and Level II QA/QC results provided by the laboratory. The laboratory final reports and data tables should be provided electronically in a format approved by the NMED. Paper copies (or electronically scanned in PDF format) of all chain-of-custody records should be provided with the reports.

### V) Risk Assessment Report

This section provides a general outline for risk assessments and also lists the minimum requirements for describing risk assessment elements.

#### a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

#### b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

#### c) Executive Summary (Abstract)

The executive summary or abstract section should provide a brief summary of the purpose and scope of the risk assessment of the subject site. The Executive Summary should also briefly summarize the conclusions of the risk assessment. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

#### d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the risk assessment. The corresponding page numbers for the titles of each unit of the report should be included in the table of contents.

#### e) Introduction

The introduction section should include the Facility name, TA designation, unit location, and unit status. General information on the current site usage and status should also be included in this section. A brief description of the purpose of the report should be provided in this section.

## f) Background

The background section should describe relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. If a risk assessment report is provided separately from a RFI report, the separate risk assessment report should include a labeled figure in the document showing the locations of current and former site structures and features.

### i) Site Description

A section should describe current site topography, features and structures including topographic drainages, man-made drainages, erosional features, current site uses and operations, and other data relevant to assessing risk at the site. Depth to groundwater and direction of groundwater flow should be included in this section. The presence and location of surface water bodies such as springs or wetlands should be noted in this section. Photographs of the site may be incorporated into this section. Ecological features of the site should be described here, including type and amount of vegetative cover, observed and expected wildlife receptors, and level of disturbance of the site. The LANL ecological checklist for the site may be included as an appendix or attachment to the document and its inclusion may meet the requirement to describe the ecological features of the site. A topographical map of the site and vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features should be included in the Figures section of the document.

If the risk assessment is presented as an appendix to an investigation report, the site description section may reference information presented in the main investigation report.

### ii) Investigation Sampling Results

A section should discuss the results of the sampling at the site. It should include a description of the history of releases of Contaminants, the known and possible sources of contamination, and the vertical and lateral extent of contamination present in each medium. This section should include summaries of sampling results of all investigations including site plans (included in the Figures section of the report) showing locations of detected Contaminants. This section should reference pertinent figures, data summary tables, and references in previous reports. References to previous reports should include page, table, and figure numbers for referenced information. Summaries of sampling data should include for each constituent: the maximum value detected, the detection limit, the 95 percent upper confidence level (UCL) of the mean value detected (if applicable to the data set), and whether the 95 percent UCL of the mean was calculated based on a normal or lognormal distribution. Background values used for comparison to inorganic constituents at the site should be presented here. The table of background values should appear in the Tables section of the document and include actual values used as well as the origin of the values (e.g., Facility-wide, UCL, and upper tolerance level (UTL)). This section should also include a discussion of how "non-detect" sample results were handled in the averaging of data.

If the risk assessment is presented as an appendix to an investigation report, the investigation sampling section may reference information presented in the main investigation report.

### iii) Determination of COPCs

A section should describe the process used to identify the COPCs evaluated in the risk assessment. If the risk assessment is presented as an appendix to an investigation report, the Determination of COPCs section may reference information presented in the main investigation report.

### g) Conceptual Site Model

A section should present the conceptual site model. It should include information on the expected fate and transport of Contaminants detected at the site. This section should provide a list of all sources of contamination at the site. Sources that are no longer considered to be ongoing but represent the point of origination for Contaminants transported to other locations should be included. The discussion of fate and transport should address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site model should appear in the Figures section of the document.

For human health risk assessments, the conceptual site model should include the current and reasonably foreseeable land use and residential land use for all risk assessments. All values for exposure parameters and the source of those values should be included in table format and presented in the Tables section of the document.

Conceptual site models presented for ecological risk assessments should identify assessment endpoints and measurement receptors for the site. The discussion of the model should explain how the measurement receptors for the site are protective of the wildlife receptors identified by DOE in the Site Description section.

Exposure point concentrations (EPCs) may be calculated for each COPC for each applicable human health exposure scenario and for ecological receptors.

### h) Human Health Risk-Screening Evaluations

#### i) Risk Screening Levels

A section should present the actual screening values used for each COPC for comparison to all human health and ecological risk screening levels and be consistent with Section IX (Cleanup Objectives and Cleanup Levels) of the Consent Order.

#### ii) Risk Assessment Results

A section should present all risk values, hazard quotients (HQs), and hazard indices (HIs) for human health based on current and reasonably foreseeable future land use. For risk assessments addressing multiple sites, results should be presented separately for each site.

### iii) Vapor Intrusion Pathway

If one or more sites has volatile organic chemicals (VOCs) as COPCs, a section should present an evaluation of the vapor intrusion pathway. If the vapor intrusion pathway is not potentially complete because of land use, topography, or other factors, a qualitative evaluation may be used. If the vapor intrusion pathway is potentially complete, a quantitative evaluation should be used.

### iv) Essential Nutrients

If essential nutrients are present as COPCs, a section should present a comparison of detected concentrations of essential nutrients to essential nutrient screening levels for appropriate exposure scenarios.

### v) Uncertainty Analysis

A section should include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties, including data evaluation and COPC identification, exposure, exposure evaluation, toxicity evaluation, and the additive approach.

### vi) Interpretation of Human Health Risk-Screening Results

A section should present all risk values, HQs, and HIs for human health based on current and reasonably foreseeable future land use, as adjusted based on the results of the uncertainty analysis.

#### i) Ecological Risk-Screening Evaluations

##### i) Scoping Evaluation

A section should present an evaluation of the breadth and focus of the ecological risk-screening evaluation. The scoping evaluation should be based on an ecological scoping checklist which should be included as an appendix.

##### ii) Assessment Endpoints

A section should describe the ecological risk screening assessment endpoints evaluated in the screening assessment.

##### iii) Ecological Risk Screening Evaluation

A section should present ecological risk-screening evaluations including comparisons of EPCs to ecological screening levels and calculations of HQs for each receptor for each COPC and HIs for each receptor.

##### iv) Uncertainty Analysis

A section should include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties, including

chemical form, exposure assumptions, toxicity values, area use factors, population area use factors, and lowest observable adverse effects levels (LOAELs). A qualitative evaluation of potential risks associated with COPCs not having ecological screening levels should also be provided.

#### v) Interpretation of Ecological Risk Screening Results

A section should include an evaluation of the potential ecological risk for each receptor considering the multiple lines of evidence presented in the assessment. A summary of the potential risk to ecological receptors should be presented.

#### j) Conclusions

A section should present the conclusions regarding potential human-health and ecological risk. As applicable, sites posing a potentially unacceptable risk to human health should be identified for each exposure scenario evaluated. As applicable, sites posing a potentially unacceptable ecological risk should be identified for each receptor.

#### k) References

A section should provide a reference list of all documents cited in the report.

#### l) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the tables. If the risk assessment is a separate report rather than an appendix to an investigation report, the analytical data tables described in Section III of this Appendix (E) should also be presented.

1. Tables presenting the EPC for each site for each applicable human health exposure scenario and for ecological receptors. The tables should include all applicable COPCs and include the number of analyses, number of detections, minimum concentration, maximum concentration, statistical distribution, EPC, and method used to calculate the EPC.
2. Tables presenting applicable physical and chemical properties for each COPC evaluated in the human health screening assessment.
3. A table presenting exposure parameters for each scenario evaluated in the human health screening assessment and the sources of the parameters.
4. Tables of all human-health screening levels used and the sources of those values. Screening levels may be included in the individual risk screening tables.
5. Tables presenting all risk values, HQs, and HIs under current and reasonably foreseeable future land use for human health for each applicable scenario.
6. Tables presenting risk values, HQs, and HIs for vapor intrusion for each site having a potentially complete vapor intrusion pathway.
7. Tables presenting essential nutrient screening results.

8. Tables presenting ecological screening levels (ESLs) for each receptor evaluated.
9. Tables presenting HQs for each COPC based on the receptor having the minimum ESL.
10. Tables presenting the HI for each ecological receptor.
11. Tables presenting area use factors for each site.
12. Tables presenting the population area use factors for each applicable receptor at each site.
13. Tables presenting adjusted HIs for each applicable receptor at each site.
14. Tables presenting LOAEL-based ESLs for each applicable COPC and receptor.
15. Tables presenting HIs based on LOAEL-based ESLs.
16. Tables presenting adjusted HIs based on LOAEL-based ESLs.

i) Figures

All figures should be provided in this section of the report. As appropriate, DOE may combine one or more of the figures. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. If the risk assessment is an appendix to an investigation report, only the conceptual site model diagram is recommended.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features or properties.
2. For human health risk assessments, a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. For ecological risk assessments, a topographical map of the site and vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features.
4. Conceptual site model diagrams for both human health and ecological risk assessments.

m) Appendices/Attachments

Each risk assessment report should include appendices containing supporting data. Appendices may include the results of statistical analyses of data sets and comparisons of data, LANL ecological checklists for the site, full sets of results of all sampling investigations at the site, or other data as appropriate. Risk assessments consisting of an appendix to an investigation report should include attachments containing supporting data not included in other appendixes to the investigation report (e.g., ecological checklists, results of statistical analyses of data sets).

## **VI) Corrective Measures Evaluation Report**

DOE should prepare corrective measures evaluations for sites requiring corrective measures using the format listed below.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures evaluation to be conducted at the subject site. The executive summary or abstract should also briefly summarize the conclusions of the evaluation. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures evaluation and the corrective action objectives for the project should also be provided in this section.

f) Background

The background section should describe the relevant background information. This section should briefly summarize historical site uses by the U.S. Government and any other entity since 1940, including the locations of current and former site structures and features. A labeled figure should be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures should be included in the background summary and labeled on the figure, as appropriate.

This section should include a brief summary of known and possible sources of contamination, the history of releases or discharges of contamination, and the vertical and lateral extent of contamination present in each medium. This section should include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. If references to previous reports are presented, they should include page, table, and figure numbers for referenced information. Summary tables and a site plan showing

relevant investigation locations should be referenced and included in the Tables and Figures sections of the document, respectively.

g) Site Description

i) Surface Conditions

A section on surface conditions should describe current and historical site topography, features, and structures, including a description of topographic drainages, man-made drainages, vegetation, erosional features, and basins. It should also include a description of current site uses and operations. This section should also include a description of those features that could potentially influence corrective action option selection or implementation such as archeological sites, wetlands, or other features that may affect remedial activities. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff or contaminant fate and transport should be included in this section. A site plan displaying the locations of all pertinent surface features and structures should be included in the Figures section of the corrective measures evaluation.

ii) Subsurface Conditions

A section on subsurface conditions should describe the site conditions observed during previous subsurface investigations. It should include relevant soil horizon and stratigraphic information, groundwater conditions, fracture data, and subsurface vapor information. A site plan showing the locations of all borings and excavations advanced during previous investigations should be included in the Figures section. A brief description of the stratigraphic units anticipated to be present beneath the site may be included in this section if stratigraphic information is not available from previous investigations conducted at the site.

h) Conceptual Site Model

i) Sources and Release Mechanisms

A section should provide a list of all sources of contamination at the subject site where corrective measures are to be considered or required. Sources that are no longer considered to be releasing Contaminants at the site, but may be the point of origination for Contaminants transported to other locations, should be included in this section. Descriptions of the mechanisms for releasing Contaminants from the sources should also be included in this section.

ii) Pathways

A section should describe potential migration pathways that could result in either acute or chronic exposures to Contaminants released from the site. It should include such pathways as utility trenches, paleochannels, surface exposures, surface drainages, stratigraphic units, fractures, structures, and other features. The migration pathways for each contaminant and each relevant medium should be tied to the potential receptors for each pathway. A discussion of contaminant characteristics relating to fate and transport of Contaminants through each pathway should also be included in this section.

### iii) Receptors and Risks

A section should provide a listing and description of all anticipated potential receptors that could possibly be affected by the contamination present at the site. Potential receptors should include, but are not limited to human and ecological receptors. Descriptions of the potential risks to receptors should also be included in this section. A summary should be provided of complete or potentially complete exposure pathways under current conditions and under reasonably foreseeable future conditions.

#### i) Regulatory Criteria

A section should set forth the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site. The appropriate cleanup levels for each site should be included, if site-specific levels have been established at separate sites. A table summarizing the applicable cleanup standards or screening levels, or inclusion of applicable cleanup standards or screening levels in the summary data tables should be included in the Tables section of the document. The risk assessment should be presented in a separate document or in an appendix to this report. If cleanup or screening levels calculated in a risk evaluation are employed, the risk evaluation document should be referenced including pertinent page numbers for referenced information. Other regulatory requirements (e.g. endangered species) applicable to corrective actions should be identified and described.

#### j) Identification of Treatment Technologies

A section should identify the treatment technologies potentially applicable for the waste and/or Contaminants at the site. General classes of technologies considered should include containment, in-situ treatment, excavation/removal, and ex-situ treatment. Candidate technologies should be screened to identify those that are potentially applicable and those that are not applicable.

#### k) Identification and Screening of Corrective Measures Alternatives

A section should identify and describe potential corrective measures for source, pathway, and receptor controls. Corrective measures alternatives should be comprised of applicable or potentially applicable technologies identified in the Identification of Treatment Technologies section. Corrective measures alternatives should include the range of available options including, as applicable, institutional controls, engineering controls, in-situ and on-site remediation alternatives, complete removal, and any combination of alternatives that would potentially achieve cleanup goals. The no action alternative should also be considered as a baseline for comparison to other alternatives.

#### l) Evaluation of Corrective Measures Alternatives

A section should provide an evaluation of the corrective measures options identified in Section k above. The evaluation should be based on the threshold criteria and the balancing criteria identified in Section XVI (Corrective Measures Evaluation). A table summarizing the corrective measures alternatives and the criteria listed in Section XVI should be included in the Tables section of this document. The general basis for evaluation of corrective measures options is defined below.

m) Selection of Recommended Corrective Measures Alternative

DOE should propose the recommended corrective measure(s) at the site and provide a justification for the selection in this section. The justification should include the supporting rationale for the remedy recommendation.

n) Design Criteria To Meet Cleanup Objectives

DOE should present general descriptions of the preliminary design for the recommended corrective measures in this section. The description should include appropriate preliminary plans and specifications to effectively illustrate the technology and the anticipated implementation of the remedial option at the subject area. The preliminary design should include a discussion of the design life of the alternative and provide preliminary engineering calculations for proposed remediation systems.

o) Schedule

A section should set forth a proposed schedule for completion of remedy-related activities such as bench tests, pilot tests, construction, installation, remedial excavation, cap construction, installation of monitoring points, and other remedial actions. The anticipated duration of corrective action operations and the schedule for conducting monitoring and sampling activities should also be presented. In addition, this section should provide a schedule for submittal of reports and data to NMED, including a schedule for submitting all status reports and preliminary data.

p) References and Map Data Sources

A section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

q) Tables

All tables should be provided in this section of the report. As appropriate, DOE may combine one or more of the tables. Tables presenting the results of previous investigations and analytical data may also be presented in an appendix.

1. Tables summarizing regulatory criteria, background levels, and the applicable cleanup standards (may be included in the analytical data tables instead of separate tables).
2. Tables summarizing the inventories of wastes disposed of or Contaminants released at the site.
3. Tables summarizing historical field survey location data.
4. Tables summarizing historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality data.
5. Tables summarizing historical soil, rock, and sediment laboratory analytical data. The summary tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.

6. Tables summarizing historical groundwater elevation and depth to groundwater data. The table should include the monitoring well depths and the screened intervals in each well, and the dates and times measurements were taken.
7. Tables summarizing historical groundwater laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
8. Tables summarizing historical surface water laboratory analytical data. The analytical data tables should include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
9. Tables summarizing historical air sample screening and laboratory analytical data. The data tables should include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data.
10. Tables summarizing historical pilot or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.
11. Tables summarizing the corrective measures alternatives and evaluation criteria.
12. Tables identifying potential remedial action technologies and summarizing their potential applicability.
13. Tables summarizing the screening of corrective measures alternatives against screening criteria.
14. Tables presenting the schedule for installation, construction, implementation, and reporting of selected corrective measures.

r) Figures

All figures should be provided in this section of the report. This section should include the following figures for each site, as appropriate. All figures should include an accurate bar scale and a north arrow. An explanation should be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures should contain a date of preparation. Figures presenting sampling locations and results of previous investigations may also be presented in an appendix.

1. A vicinity map showing topography and the general location of the subject site relative to surrounding features and properties.
2. A site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and features. Off-site well locations and other relevant features should be included on the site plan, if appropriate. Additional site plans may be appropriate to present the locations of relevant off-site well locations, structures, and features.
3. Figures presenting historical soil boring or excavation locations and sampling locations.
4. Figures presenting historical soil sample field screening and laboratory analytical data, if appropriate.

5. Figures presenting all existing wells including vapor monitoring wells and piezometers.
6. Figures presenting historical groundwater elevation data and indicating groundwater flow directions.
7. Figures presenting historical groundwater laboratory analytical data including past data, if applicable. The analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map.
8. Figures presenting historical surface water sample locations and laboratory analytical data including past data, if applicable. The analytical data corresponding to each sampling location may be presented as individual concentrations or in table form on the figure.
9. Figures presenting historical air sampling locations and presenting air quality data. The field screening or laboratory analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map.
10. Figures presenting historical pilot and other test locations and data, if applicable, including site plans or graphic data presentation.
11. Figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.
12. Figures depicting the baseline conceptual site model.
13. Figures presenting the locations of existing and proposed remediation systems.
14. Figures presenting existing remedial system design and construction details.
15. Figures presenting preliminary design and construction details for recommended corrective measures.
16. Figures depicting the conceptual site model following implementation of the recommended corrective measures.

s) Appendices

Each corrective measures evaluation should include, as appropriate, appendices presenting conceptual designs of corrective measures alternatives and relevant additional data, such as historical investigation results, pilot or other test or investigation data, remediation system design specifications, system performance data, or cost analyses as necessary.

## **VII) Corrective Measures Implementation Plan**

DOE should prepare corrective measures implementation plans for sites requiring corrective measures using the format listed below.

a) Title Page

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

b) Signature Block

A signature block providing spaces for the name and title of the responsible representatives should be provided.

c) Executive Summary (Abstract)

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures to be implemented at the subject site. The executive summary or abstract should also briefly summarize the approach to the corrective measures to be implemented. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

d) Table of Contents

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures implementation plan. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

e) Introduction

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures to be implemented and the corrective action objectives for the project should also be provided in this section.

f) Background

The background section should describe the relevant background information at a summary level including:

- historical site uses by the U.S. Government and any other entity since 1940;
- the locations of current and former site structures and features (a labeled figure should be included in the document showing the locations of current and former site structures and features);
- the locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures; and
- the vertical and lateral extent of contamination present in each medium.

g) Site Description

This section should describe the site at which the corrective measures will be implemented, providing for the locations of structures, utilities, surface grades and conditions.

h) Regulatory Criteria

This section should describe how the corrective measure will meet the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site after implementation of the remedy.

i) Description of Corrective Measures to be Implemented

The Corrective Measures Implementation Plan should provide a description of the following elements:

- The selected final remedy,
- The cleanup goals and remediation system objectives, and
- The identification and qualifications of all persons, consultants, and contractors that will be implementing the remedy.

j) Figures, Tables, and Appendices

The plan should include the following items:

- Detailed engineering design drawings and systems specifications for all elements of the remedy;
- A construction work plan;
- An operation and maintenance plan;
- The results of any remedy pilot tests;
- A plan for monitoring the performance of the remedy, including sampling and laboratory analysis of all affected media;
- A waste management plan;

k) Schedule

This section should set forth a proposed schedule for submittal to NMED of periodic progress reports and for implementation of the remedy.

### **VIII) Corrective Measures Implementation Report**

DOE should prepare corrective measures implementation reports for sites requiring corrective measures using the format listed below.

**a) Title Page**

The title page should include the type of document; Facility name; TA designation; SWMU or AOC name, site, and any other unit name; and the submittal date.

**b) Signature Block**

A signature block providing spaces for the name and title of the responsible representatives should be provided.

**c) Executive Summary (Abstract)**

This executive summary or abstract should provide a brief summary of the purpose and scope of the corrective measures that were implemented at the subject site. The executive summary or abstract should also briefly summarize the final configuration and justification for acceptability of the corrective measures implemented. The Facility, SWMU or AOC name, site name, any other unit name, location, and TA designation should be included in the executive summary.

**d) Table of Contents**

The table of contents should list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report should be included in the table of contents.

**e) Introduction**

The introduction section should include the Facility name, TA designation, site location, and site status. General information on the current site uses and status should be included in this section. A brief description of the purpose of the corrective measures that were implemented and how the corrective action objectives for the project were met.

**f) Background**

The background section should describe the relevant background information at a summary level including:

- historical site uses by the U.S. Government and any other entity since 1940;
- the locations of current and former site structures and features (a labeled figure should be included in the document showing the locations of current and former site structures and features);
- the locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures; and
- the vertical and lateral extent of contamination present in each medium before the corrective measures implementation.

g) Description of Corrective Measures that were Implemented

This section should describe or summarize the corrective measures implemented at the site. A statement that the remedy has been completed in accordance with the NMED-approved corrective measures implementation plan for the remedy. Any differences from the Corrective Measures Implementation Plan should be identified with an explanation of the rationale for deviations from the original plan.

h) Site Description

This section should describe the site following implementation of the corrective measures. Photographs and figures may be used.

i) Conceptual Site Model

This section should be provided to update the conceptual site model (as presented in the CME Report) for the as-built configurations at the completion of the corrective measures implementation. Any differences from the Corrective Measures Implementation Plan should be identified with an explanation of the expected effect on the conceptual site model of anticipated performance. The final conceptual site model should address changes in the sources of Contaminants and release mechanisms, pathways, and receptors and risks.

j) Regulatory Criteria

This section should describe how the corrective measure meets the cleanup standards, risk-based screening levels, and risk-based cleanup goals for each pertinent medium at the subject site after implementation of the remedy.

k) References and Map Data Sources

This section should provide a reference list of all documents cited in the report. The sources of geospatial data used to develop maps and figures presented in the report should also be provided.

l) Figures, Tables, and Appendices

The report should include: as-built drawings and specifications signed and stamped by a registered professional engineer, if applicable; copies of the results of all monitoring, including sampling and analysis, and other data generated during the remedy implementation; and copies of all waste disposal records.

**APPENDIX F**  
**SAMPLING/ANALYTICAL/FIELD METHOD**  
**REGULATORY GUIDANCE**

## I. INVESTIGATION AND SAMPLING METHODS AND PROCEDURES

The purpose of this Appendix is to provide guidance on how to conduct field activities where environmental investigation, corrective action, sampling, or monitoring is being conducted or proposed. The site-specific RFI work plans should include the data quality objectives (DQOs) and the proposed methods to be used to conduct activities at each SWMU or AOC and, although not compulsory, generally should be prepared in accordance with the formats recommended in Appendix E of this Consent Order.

The methods used to conduct investigation, corrective action, and monitoring activities should be sufficient to achieve the DQOs presented in the work plan, fulfill the requirements of this Consent Order, and provide accurate data for the evaluation of site conditions, the nature and extent of contamination and Contaminant migration, and for corrective measures selection and implementation, where necessary. The methods presented in Section I.B of this Appendix (F) for environmental investigation and sampling are not intended to be an exhaustive inventory of the possible methods that may be necessary to fulfill the requirements of this Consent Order. The methods for conducting investigations, corrective actions, and monitoring must be determined based on the DQOs and conditions and Contaminants that exist at each SWMW or AOC.

DOE may propose alternative methods for data collection from those included in this Appendix (F). Such alternative methods should be discussed with NMED prior to implementation.

### I.A. Standard Operating Procedures

DOE should provide a brief description of investigation, sampling or analytical methods and procedures in documents submitted to NMED. DOE may reference relevant Standard Operating Procedures as presented on the Los Alamos National Laboratory (LANL) website. The reference should include the appropriate Internet address.

### I.B. Investigation, Sampling, and Analysis Methods

#### I.B.1. Introduction and Purpose

This Section (I.B) of this Appendix (F) provides recommendations for field investigations, sample collection, handling and screening procedures, field and laboratory sample analysis, and quality assurance procedures for samples of the medium being investigated or tested at the Facility.

The purpose of this Section (I.B) is to: 1) provide recommendations for drilling and sample collection in exploratory borings and other excavations; 2) provide recommendations for sampling of the target media; 3) provide recommendations for monitoring of groundwater and vadose zone conditions; and 4) identify screening, analytical, and quality assurance procedures that should be implemented during field sampling activities and laboratory analyses.

The quality assurance procedures referenced in the previous paragraph include: 1) the Facility investigation DQOs; 2) the methods for QA/QC recommended 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.

## I.B.2. Field Exploration Activities

Exploratory borings should be advanced as approved by NMED in site-specific work plans. Any additional boring locations, if required, may be determined by DOE or NMED, consistent with the Consent Order. The depths and locations of all exploratory and monitoring well borings should be specified in the site-specific work plans submitted to NMED for approval prior to the start of the respective field activities.

## I.B.3. Subsurface Features/Utility Geophysical Surveys

DOE should conduct surveys to locate underground utilities, pipelines, structures, drums, debris, and other buried features, including buried waste, in the shallow subsurface prior to the start of field exploration activities. The methods used to conduct the surveys, such as magnetometer, ground penetrating radar, resistivity, or other methods, should be selected based on the characteristics of the site and the possible or suspected underground structures. The results of the surveys should be included in the investigation reports submitted to NMED. DOE is responsible for locating and clearing all above- and below-ground utilities or other hazards at any site prior to conducting field work.

## I.B.4. Drilling and Soil, Rock, and Sediment Sampling

### I.B.4.a) Drilling

Exploratory and monitoring well borings should be drilled using the most effective, proven, and practicable method for recovery of undisturbed samples and potential Contaminants.

DOE should propose drilling methods in the site-specific work plans submitted for each subject area. Exploratory borings should be advanced to the unit- and location-specific depths specified in the work plan and approved by NMED. The borings should be advanced in accordance with the following guidance:

- In all borings, 25 ft below the deepest detected contamination based on field screening, laboratory analyses, and/or previous investigations at the site.
- Twenty ft below the base of disposal units if contamination is not detected.
- Five ft below the base of shallow structures such as piping or building sumps, foundations, footings, or other building structures.
- Five ft below the contact between canyon alluvium and bedrock.
- Five feet below the alluvial groundwater table.
- One hundred ft below the deepest known intermediate perched groundwater zone.
- One hundred ft below the top of the regional aquifer.
- Depths specified by NMED based on regional or unit specific data needs.

Precautions should be taken to prevent the migration of Contaminants between geologic, hydrologic, or other identifiable zones during drilling and well installation activities. Reasonable efforts should be made to isolate Contaminant zones from other zones encountered in the borings.

The drilling and sampling should be accomplished under the direction of a qualified engineer or geologist who should maintain a detailed log of the materials and conditions encountered in each

boring. Both sample information and visual observations of the cuttings and core samples should be recorded on the boring log. Known site features and/or site survey grid markers should be used as references to locate each boring prior to surveying the location as described in Section I.B.2.f of this Appendix (F). The boring locations should be measured to the nearest foot, and locations should be recorded on a scaled site map upon completion of each boring.

Trenching and other exploratory excavation methods should follow the applicable general procedures outlined in this Appendix (F). The particular methods proposed for use by DOE for exploratory excavation and sampling at any specific unit should be included in the site-specific investigation work plan submitted to NMED.

#### I.B.4.b) Soil and Rock Sampling

Relatively undisturbed discrete soil and rock samples should be obtained, where possible, during the advancement of each boring for the purpose of logging, field screening, and analytical testing. The samples should be collected in accordance with the following guidance:

- At the depth immediately below the base of the disposal unit or facility structure and at the fill-native soil interface.
- At the maximum depth of each boring.
- At the depths of contacts or first encounter, observed during drilling, with geologic units of different lithology, structural or textural characteristics, or of relatively higher or lower permeability.
- Of soil or rock types relatively more likely to sorb or retain Contaminants than surrounding lithologies.
- At the depth of the first encounter, during drilling, with shallow or intermediate saturated zones.
- At intervals suspected of being source or contaminated zones.
- At the top of the regional aquifer.
- At other intervals approved or required by NMED.

The sampling interval for the borings may be modified, or samples may be obtained from a specific depth, based on field observations. A decontaminated split-barrel sampler lined with brass sleeves, a coring device, or other method approved by NMED should be used to obtain samples during the drilling of each boring.

A split barrel sampler lined with brass sleeves or a coring device is the preferred sampling method for borehole soil, rock, and sediment sampling. The following procedures should be followed if a split barrel sampler is used. Upon recovery of the sample, one or more brass sleeves should be removed from the split barrel sampler and the open ends of the sleeves covered with Teflon tape or foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory. If brass sleeves are not used, a portion of the sample should be directly placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. Encore™ samplers or equivalent sampling devices are preferred for collection of solid samples for VOC analysis, if brass sleeves are not used. The remaining portions of the sample should be used for logging and field screening, as described in Sections I.B.2.c and I.B.2.d of this Appendix (F), respectively.

Discrete samples should be collected for field screening and laboratory analyses. Homogenization of discrete samples collected for analyses other than for VOC and SVOC analyses should be performed by the analytical laboratory, if homogenization is necessary. DOE may submit site-specific, alternative methods for homogenization of samples in the field to NMED for review and written approval.

Samples to be submitted for laboratory analyses should be selected based on: 1) the results of the field screening or mobile laboratory analyses; 2) the position of the sample relative to groundwater, suspected releases, or site structures; 3) the sample location relative to former or altered site features or structures; 4) the stratigraphy encountered in the boring; and 5) the specific objectives and requirements of this Consent Order. The proposed number of samples and analytical parameters should be included as part of the site-specific work plan submitted to NMED for approval prior to the start of field investigation activities at each unit. In accordance with Section XIII.C, work plans should allow for flexibility in modifying the project-specific tasks based on information obtained during the course of the investigation.

#### 1. Sediment Sampling

Sediment samples should be collected in the same manner as described in Section I.B.2.b.ii for soil and rock sampling where borings are drilled to explore alluvial subsurface conditions. The sampling device should be a decontaminated, hand-held stainless steel coring device, shelly tube, thin-wall sampler, or other device approved by NMED where sediment sampling is conducted without the use of the drilling methods described in Section I.B.2.b.i of this Appendix (F). The samples should be transferred to pre-cleaned laboratory prepared containers for submittal to the laboratory. Samples obtained for volatiles analysis should be collected using Encore™ or equivalent samplers, shelly tubes, thin-wall samplers, or other device approved by NMED. With the exception of Encore™ or equivalent samplers, the ends of the samplers should be lined with Teflon tape or aluminum foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory.

The physical characteristics of the sediment (such as mineralogy, ASTM soil classification, rock classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations should be recorded in the field log.

#### I.B.4.c) Investigation Derived Waste

Investigation derived waste (IDW) includes general refuse, drill cuttings, excess sample material, water (decontamination, development and purge), and disposable equipment generated during the course of investigation, corrective action, or monitoring activities. Drill cuttings, excess sample material and decontamination fluids, and all other IDW should be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of Contaminants suspected or encountered. Proposed IDW management should be included with the unit-specific investigation work plan submitted to NMED for approval prior to the start of field investigations. Borings not completed as groundwater or vapor monitoring wells should be abandoned in accordance with the recommended methods listed in Section II.D of this Appendix (F). Borings completed as groundwater monitoring wells should be constructed in accordance with the recommendations described in Section II.C of this Appendix (F).

#### I.B.4.d) Logging of Soil/Rock and Sediment Samples

Samples obtained from all exploratory borings and excavations should be visually inspected and the soil or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and D2488, (Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)). Detailed logs of each boring should be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling should be recorded on the logs. Field boring logs, test pit logs, and field well construction diagrams should be converted to the format acceptable for use in final reports submitted to NMED. If requested, draft boring logs, test pit logs, and well construction diagrams should be submitted to NMED for review within thirty (30) days after the completion of each boring or monitoring well.

#### I.B.4.e) Soil, Rock, and Sediment Sample Field Screening

Samples obtained from borings should be screened in the field for evidence of the potential presence of Contaminants. Field screening results should be recorded on the exploratory boring and excavation logs. Field screening results are used as a general guideline to determine the nature and extent of possible contamination. In addition, screening results should be used to aid in the selection of soil, rock, sediment, and vapor-phase samples for laboratory analysis. NMED recognizes that field screening alone will not detect the possible presence or full nature and extent of all Contaminants that may be encountered at the site.

The primary screening methods to be used should include: 1) visual examination; 2) headspace vapor screening for VOCs; and 3) metals screening using X-ray fluorescence (XRF). Additional screening for site- or release-specific characteristics such as pH, high-explosives (HE), or for other specific compounds using field test kits should be conducted where appropriate.

Headspace vapor screening should target VOCs and should be conducted by placing a soil or rock sample in a plastic sample bag or a foil-sealed container allowing space for ambient air. The container should be sealed and then shaken gently to expose the soil or rock to the air trapped in the container. The sealed container should be allowed to rest for a minimum of five minutes while vapors equilibrate. Vapors present within the sample bag headspace should then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature should be recorded on the field boring or test pit log for each sample. The monitoring instruments should be calibrated each day to the manufacturer's standard for instrument operation. A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by NMED may be used for VOC field screening. The limitations, precision, and calibration procedures of the instrument to be used for VOC field screening should be included in the site-specific investigation work plan prepared for each unit.

XRF may be used to screen soil, rock, or sediment samples for the presence of metals. XRF screening requires proper sample preparation and proper instrument calibration. Sample preparation and instrument calibration procedures should be documented in the field logs. The methods and procedures for sample preparation and instrument calibration should be determined prior to the start of field activities. Field XRF screening results for selected metals may be used in

lieu of laboratory analyses; however, the results should, at a minimum, be confirmed by laboratory analyses at a frequency of 20 percent (one sample per every five analyzed by XRF analysis).

Field screening results are site- and boring-specific and the results vary with instrument type, media screened, weather conditions, moisture content, soil or rock type, and type of Contaminant. DOE should record on the field logs all conditions capable of influencing the results of field screening. DOE should submit to NMED conditions potentially influencing field screening results as part of the site-specific investigation, corrective action, or monitoring reports.

DOE should submit the samples with the greatest apparent degree of contamination, based on field observations and field screening, for laboratory analysis. DOE should also use the location of the sample relative to groundwater, stratigraphic units or contacts, and the proximity to significant site or subsurface features or structures as a guideline for sample selection. In addition, DOE should submit the samples with no or little apparent contamination, based on field screening, for laboratory analysis if the intention is to confirm that the base (or other depth interval) of a boring or other sample location is not contaminated.

#### I.B.4.f) Soil, Rock, and Sediment Sample Types

DOE should collect soil, rock, and sediment samples at the frequencies outlined in the site-specific investigation, corrective action, or monitoring work plans for each SWMU, AOC, or other site submitted by DOE for review and written approval by NMED. The samples collected should be representative of the media and site conditions being investigated or monitored. DOE should collect QA/QC samples to monitor the validity of the soil, rock, and sediment sample collection procedures. Field duplicates should be collected at a rate of ten percent. DOE should collect equipment blanks from all sampling apparatus at a frequency of ten percent for chemical analysis. Equipment blanks should be collected at a frequency of one per day if disposable sampling equipment is used. DOE should collect field blanks at a frequency of one per day for each medium (with the exception of air samples) at each SWMU or AOC. Reagent blanks should be used if chemical analytical procedures requiring reagents are employed in the field as part of the investigation or monitoring program. The resulting data will provide information on the variability associated with sample collection, handling, and laboratory analysis operations. The blanks and duplicates should be submitted for laboratory analyses associated with the project-specific Contaminants, data quality concerns, and media being sampled.

#### I.B.4.g) Sample Point and Structure Location Surveying

The horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface at each monitoring well location should be determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49 through 56 (Repl. Pamp. 1993)). The surveys should be conducted in accordance 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. Alternative survey methods may be proposed by DOE in site-specific work plans. Any alternative survey method must be discussed with NMED prior to implementation. Horizontal positions should be measured to the nearest 0.1-ft, and vertical elevations should be measured to the nearest 0.01-ft. DOE should prepare site map(s), certified by a registered New Mexico professional land

surveyor, presenting all surveyed locations and elevations including relevant site features and structures for submittal with all associated reports to NMED.

Site attributes (e.g., soil sample locations, sediment sample locations, springs, outfalls, pertinent structures, monitoring stations, as well as staked out sampling grids) should be located by using the global positioning system (GPS), the electronic total station with prism reflectors, or a combination of both surveying systems, or by using a registered New Mexico Registered Land Surveyor using the methods described in the paragraph above. Horizontal locations should be measured to the nearest 0.5 ft.

#### I.B.4.h) Subsurface Vapor-phase Monitoring and Sampling

Samples of subsurface vapors should be collected from vapor monitoring points from both discrete zones, selected based on investigation and field screening results, and as total well subsurface vapor samples.

DOE should, at a minimum, collect vapor samples for field measurement of the following:

- Percent oxygen;
- Organic vapors (using a photo-ionization detector with an 11.7 eV (electron volt) lamp, a combustible vapor indicator or other method);
- Percent carbon dioxide;
- Static subsurface pressure; and
- Other parameters (such as carbon monoxide and hydrogen sulfide) if required by NMED.

DOE also should collect vapor samples for laboratory analysis of the following as required:

- Percent moisture;
- VOCs; and
- Other analytes if requested.

Vapor samples analyzed by the laboratory for percent moisture and VOCs should be collected using SUMMA canisters or other equivalent sample collection method. The samples should be analyzed for VOC concentrations by EPA Method TO-15, as it may be updated, or equivalent VOC analytical method.

Field vapor measurements, the date and time of each measurement, and the instrument used should be recorded on a vapor monitoring data sheet. The instruments used for field measurements should be calibrated daily in accordance with the manufacturer's specifications. The methods used to obtain vapor-phase field measurements and samples should be discussed with NMED prior to the start of air monitoring at each SWMU, AOC, or other site where vapor-phase monitoring is conducted.

#### I.B.5. Groundwater Monitoring

##### I.B.5.a) Groundwater Levels

Groundwater levels should be obtained, either through manual measurements or using a water-level pressure transducer, prior to purging in preparation for a sampling event. If the transducer is

malfunctioning and manual water-level measurements cannot be obtained, historical water level data may be used to meet the water level measurement requirement, to calculate purge volume, and to allow sampling to proceed.

The depth to groundwater should be recorded relative to the surveyed well casing rim or other surveyed datum, and should be measured and recorded at levels of accuracy consistent with manufacturers specifications.

Where possible, monitoring wells that are routinely sampled should be equipped with pressure transducers to measure and record water levels on a regular basis. The pressure transducer recording frequency will vary depending on the monitoring objectives for the well, but should always be less than 24 hours, and more typically 1-2 hours.

#### I.B.5.b) Surface Water Measurements

Stream flow rates within each watershed should be measured in conjunction with sampling events.

#### I.B.5.c) Groundwater Sampling

Groundwater samples should initially be obtained from newly installed alluvial monitoring wells between ten (10) and thirty (30) days after completion of well development. Groundwater samples should initially be obtained from newly installed intermediate zone and regional aquifer monitoring wells between ten (10) and sixty (60) days after completion of well development. Groundwater monitoring and sampling should be conducted at an interval agreed to by NMED and DOE after the initial sampling event. All monitoring wells within a watershed or area-specific monitoring group should be sampled within twenty one (21) days of the start of the groundwater sampling event. Sampling should be conducted in accordance with an NMED-approved groundwater monitoring work plan, if applicable.

Groundwater samples should be collected from all saturated zones, where possible, within exploratory borings not intended to be completed as monitoring wells prior to abandonment of the borings.

#### I.B.5.d) Well Purging

Monitoring wells should be purged prior to sampling to remove stagnant water and to ensure that samples collected are representative. The U.S. Environmental Protection Agency (EPA) outlines two purging methods to remove stagnant water from a well casing before sampling: the “low-flow approach” and the “well-volume approach.” Either approach is valid, and can provide representative samples, depending on the well construction and aquifer characteristics.

To ensure groundwater samples are as representative as possible, field parameter stability criteria for purging should be based on guidance or recommendations by the EPA, the USGS or other current perspectives for groundwater sampling. In some cases, purge-volume and/or field-parameter stability requirements cannot be met or special sampling requirements may need to be implemented. In these cases, well-specific sampling protocols may be applied.

Groundwater quality field parameters measured during purging include pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature. Where possible, the

groundwater quality parameters should be measured using a flow-through cell and a multiparameter meter. The volume of groundwater purged, the instruments used, and the readings obtained at each interval should be recorded on the field monitoring log, or in an electronic equivalent log on a computer or mobile device.

Groundwater samples should be obtained from each well after field parameters have stabilized, and sufficient volume has been purged to ensure that the sample is representative of formation water. The groundwater samples should be collected in appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Recommended sample handling and chain-of-custody procedures are described in Sections I.B.6. and I.B.9. of this Appendix (F). Decontamination procedures should be established for reusable water sampling equipment as described in Section I.B.3 of this Appendix (F).

All purged groundwater should be characterized based on the results of the analysis of water samples from the well from which the purge water originated or by direct sampling and analysis of the purge water. Purge water should be land applied if it meets the criteria in the NMED-approved Notice of Intent (NOI) for land application of groundwater. If the purge water is RCRA hazardous, it should be managed in accordance with appropriate hazardous waste management requirements.

#### I.B.5.e) Surface Water Sample Collection

Surface water samples should be collected using methods agreed to by the Parties. Samples should be collected in clean laboratory-prepared sampling containers. The methods and instruments used to measure field parameters should be agreed to by the Parties prior to conducting surface water sampling. The sampling and monitoring techniques used and the measurements obtained should be recorded in the field monitoring reports.

#### I.B.5.f) Groundwater and Surface Water Sample Types

Groundwater samples should be collected from monitoring wells identified in the monitoring plan, and surface water samples should be collected at predetermined locations identified in the plan. Field duplicates, field blanks, equipment rinsate blanks, reagent blanks, if necessary, and trip blanks should be obtained for quality assurance during water sampling activities. The samples should be handled as described in Sections I.B.6. and I.B.9. of this Appendix (F).

Quality assurance/quality control sample collection including field duplicates, field blanks, equipment rinsate blanks, performance evaluation blanks (PEBs), and trip blanks should be described and collected in accordance with an approach presented in each annual Interim Facility-Wide Groundwater Monitoring Plan.

#### I.B.6. Sample Handling

The following recommended procedures should be used when collecting samples during investigation, corrective action, and monitoring activities:

I.B.6.a) Neoprene, nitrile, or other protective gloves should be worn when collecting samples. All samples collected of each medium for chemical analysis should be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in brass sleeves or in Encore™ or equivalent samplers. Upon recovery of the sample collected using split barrel samplers with brass sleeves, the brass sleeves should be removed from the split barrel sampler and the open ends of the sleeves should be lined with Teflon tape or foil and sealed with plastic caps. The caps should be fastened to the sleeve with tape for storage and shipment to the analytical laboratory. The sample depth and the top of the sample should be clearly marked. Sample container volumes and preservation methods should be in accordance with the most recent EPA SW-846 and established industry practices for use by accredited analytical laboratories. Sufficient sample volume should be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis.

I.B.6.b) Sample labels and documentation should be completed for each sample following procedures included in the site-specific work plans approved by NMED. Immediately after the samples are collected, they should be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as described in Section I.B.6.b of this Appendix (F), should be followed for all samples collected. All samples should be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times. Where possible, samples should be submitted to the laboratory within 48 hours after their collection.

Shipment procedures should include the following:

- Individual sample containers should be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler should be sealed and secured in case of sample container leakage. Temperature blanks should be included with each shipping container.
- Each cooler or other container should be delivered directly to the analytical laboratory.
- Glass bottles should be separated in the shipping container by cushioning material to prevent breakage.
- Plastic containers should be protected from possible puncture during shipping using cushioning material.
- The chain-of-custody form and sample request form should be shipped inside the sealed storage container to be delivered to the laboratory.
- Chain-of-custody seals should be used to seal the sample-shipping container in conformance with EPA protocol.
- Signed and dated chain-of-custody seals should be applied to each cooler prior to transport of samples from the site.

#### I.B.6.c) In-situ Testing

In-situ permeability tests, corrective measures system pilot tests, stream flow tests, and other tests conducted to evaluate site and subsurface conditions should be designed to accommodate specific site conditions and to achieve the test objectives. The tests should be conducted in order to appropriately represent site conditions and in accordance with USGS, ASTM or other methods generally accepted by the industry. Detailed logs of all relevant site conditions and measurements should be maintained during the testing events. A summary of the general test results, including unexpected or unusual test results and equipment failures or testing limitations should be reported to NMED. The summary should be presented in a format acceptable to NMED and in general accordance with the report formats recommended in Appendix E.

#### I.B.6.d) Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. A designated decontamination area should be established for decontamination of drilling equipment, reusable sampling equipment and well materials. The drilling rig should be decontaminated prior to entering the site or unit. Drilling equipment or other exploration equipment that may come in contact with the borehole should be decontaminated by steam cleaning, by hot-water pressure washing, or by other method prior to drilling each new boring.

Sampling or measurement equipment, including but not limited to, stainless steel sampling tools, split-barrel or core samplers, well developing or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, should be decontaminated in accordance with the following procedures or other methods before each sampling attempt or measurement:

- Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter.
- Rinse with potable tap water.
- Wash with nonphosphate detergent or other detergent (examples include Fantastik™, Liqui-Nox®) followed by a tap water rinse.
- Rinse with 0.1 M nitric acid (to remove trace metals, if necessary) followed by a tap water rinse.
- Rinse with methanol (to remove organic compounds, if necessary) followed by a tap water rinse.
- Rinse with potable tap water.
- Double rinse with deionized water.

All decontamination solutions should be collected and stored temporarily as described in Section I.B.5 of this Appendix (F). Decontamination procedures and the cleaning agents used should be documented in the daily field log.

#### I.B.7. Field Equipment Calibration Procedures

Field equipment requiring calibration should be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks should be conducted daily, or at other intervals consistent with the manufacturer's specifications,

and the instruments should be recalibrated, if necessary. Calibration measurements should be recorded in the daily field logs. If field equipment becomes inoperable, its use should be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument should be used.

#### I.B.8. Collection and Management of Investigation Derived Waste

All IDW should be properly characterized and disposed of in accordance with all Federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. DOE should include a description of anticipated management of IDW as part of the applicable work plan submitted to NMED for review prior to disposal of any IDW produced during investigation, corrective action, or monitoring activities. All water generated during sampling and decontamination activities should be temporarily stored at satellite accumulation areas or transfer stations in labeled 55-gallon drums or other containers until proper characterization and disposal can be arranged. The IDW may be characterized for disposal based on the known or suspected Contaminants potentially present in the waste.

#### I.B.9. Documentation of Field Activities

##### I.B.9.a) General

Daily field activities, including observations and field procedures, should be recorded on appropriate forms. The original field forms should be maintained at the Facility. Copies of the completed forms should be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink should be used to record all field activities. Alternatively, electronic field forms may be maintained on a routinely backed up server. Photographic documentation of field activities should be performed, as appropriate. The daily record of field activities should include the following:

- Site or unit designation;
- Date;
- Time of arrival and departure;
- Field investigation team members including subcontractors and visitors;
- Weather conditions;
- Daily activities and times conducted;
- Observations;
- Record of samples collected with sample designations and locations specified;
- Photographic log;
- Field monitoring data, including health and safety monitoring if conditions arise that require modification of required work;
- Equipment used and calibration records, if appropriate;
- List of additional data sheets and maps completed;
- An inventory of the waste generated and the method of storage or disposal; and
- Signature of personnel completing the field record.

### I.B.9.b) Sample Custody

All samples collected for analysis should be recorded in the field report or data sheets. Chain-of-custody forms should be completed at the end of each sampling day, prior to the transfer of samples off site, and should accompany the samples during shipment to the laboratory. A signed and dated custody seal should be affixed to the lid of the shipping container. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form should be signed as received by the laboratory, and the conditions of the samples should be recorded on the form. The original chain-of-custody form should remain with the laboratory and copies should be returned to the relinquishing party. DOE should maintain copies of all chain-of-custody forms generated as part of sampling activities. Copies of the chain-of-custody records (either paper copies or electronically scanned in PDF format) should be included with all draft and final laboratory reports submitted to NMED.

### I.C. Chemical Analyses

DOE should submit all samples for laboratory analysis to accredited contract laboratories. The laboratories should use the most recent EPA and/or industry-accepted extraction and analytical methods for chemical analyses for target analytes as the testing methods for each medium sampled.

DOE should submit a list of analytes and analytical methods to NMED for review and written approval as part of each site-specific investigation, corrective action, or monitoring work plan. The detection and reporting limits for each method should be less than applicable background, screening, or regulatory cleanup levels. The preferred method reporting (practical quantitation) limits are 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 should be considered data quality exceptions and the reasons for the elevated detection limits should be reported to NMED. These data should not be used for statistical analyses. All analytical data (non-detects, estimated values, and detects) should be included in the electronic copy of the investigation report in Microsoft™ Excel format with qualifiers as attached from the analytical laboratory. The summary tables should include only detects of the data based on the corresponding qualifiers. DOE should not censor the data based on detection limits, quantitation limits, or measurement uncertainty.

#### I.C.1. Laboratory QA/QC Requirements

The following recommendations for laboratory QA/QC procedures should be considered the minimum QA/QC standards for the laboratories employed by DOE that provide analytical services for environmental investigation, corrective action, and monitoring activities conducted at the Facility.

- Quality Assurance Procedures

Contract analytical laboratories should maintain internal quality assurance programs in accordance with EPA and industry-wide accepted practices and procedures. At a minimum, the laboratories should use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), blank spike/blank spike duplicates (BS/BSD), and laboratory control samples to demonstrate analytical QA/QC. The laboratories should establish control limits for

individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories should establish internal QA/QC that meets EPA's laboratory certification requirements. The specific procedures that should be completed are identified in the following sections.

#### I.C.1.a) Equipment Calibration Procedures and Frequency

The laboratories' equipment calibration procedures, calibration frequency, performance criteria, and calibration standards should be in accordance with the EPA test methodology requirements and documented in the laboratories' quality assurance and SOP manuals. All instruments and equipment used by the laboratory should be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations as well as governing analytical methods. Operation, calibration, and maintenance should be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance should be kept on file at the laboratory.

#### I.C.1.b) Laboratory QA/QC Samples

Analytical procedures should be evaluated by analyzing reagent or method blanks, surrogates, MS/MSDs, BS/BSDs, and laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples and frequency of analysis to be completed should be documented in the cited EPA or other accepted test methodologies. At a minimum, the laboratory should analyze laboratory blanks, MS/MSDs, BS/BSDs, and laboratory duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and at a frequency of one in ten for non-EPA test methods or as required by the governing methodology. Laboratory batch QA/QC samples should be specific to the project.

#### I.C.1.c) Laboratory Deliverables

The laboratory analytical data package should be prepared in accordance with EPA-established Level III or IV analytical support protocol. The following should be provided in the analytical laboratory reports either electronically or in hard (paper) copy for this project:

- Transmittal letter, including information about the receipt of samples, the testing methodology performed, any deviations from the required procedures, any problems encountered in the analysis of the samples, any data quality exceptions, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report.
- Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (mg/kg) or micrograms per kilogram in dry-weight basis; water sample results in consistent units (milligrams per liter or micrograms per liter ( $\mu\text{g/L}$ )); vapor sample results in consistent units (ppmv or  $\mu\text{g/m}^3$ ); and detection limits for undetected analytes. Results should be reported for all field samples, including field duplicates and blanks, submitted for analysis.
- Method blank results, including detection limits for undetected analytes.
- Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only).

- MS/MSD and/or BS/BSD spike concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits.
- Laboratory duplicate results for inorganic analyses, including relative percent differences and corresponding control limits.
- Sample chain-of-custody documentation.
- Holding times and conditions.
- Conformance with required analytical protocol(s).
- Instrument calibration.
- Blanks.
- Detection/quantitation limits.
- Recoveries of surrogates.
- Variability for duplicate analyses.
- Completeness.
- Data report formats.
- The following data deliverables for organic compounds should be required from the laboratory:
  - A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
  - Report of sample collection, extraction, and analysis dates, including sample holding conditions;
  - Tabulated results for samples in units as specified, including data qualification in conformance with EPA protocol, and definition of data descriptor codes;
  - Reconstructed ion chromatograms for gas chromatograph/mass spectrometry (GC/MS) analyses for each sample and standard calibration;
  - Selected ion chromatograms and mass spectra of detected target analytes (GC/MS) for each sample and calibration with associated library/reference spectra;
  - Gas chromatograph/electron capture device (GC/ECD) and/or gas chromatograph/flame ionization detector (GC/FID) chromatograms for each sample and standard calibration;
  - Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards;
  - A calibration data summary reporting calibration range used and a measure of linearity [include decafluorotriphenylphosphine (DFTPP) and p-bromofluorobenzene (BFB) spectra and compliance with tuning criteria for GC/MS];
  - Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte;
  - Analyte concentrations with reporting units identified, including data qualification in conformance with the CLP Statement of Work (SOW) (include definition of data descriptor codes);
  - Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample;
  - Recovery assessments and a replicate sample summary, including all surrogate spike recovery data with spike levels/concentrations for each sample and all MS/MSD results (recoveries and spike amounts) when analyzed; and

- Report of tentatively identified compounds with comparison of mass spectra to library/reference spectra.
- The following data deliverables for inorganic compounds should be required from the laboratory:
  - A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications; including signature from authority representative certifying to the quality and authenticity of data as reported;
  - Report of sample collection, digestion, and analysis dates, with sample holding conditions;
  - Tabulated results for samples in units as specified, including data qualification in conformance with the CLP SOW (including definition of data descriptor codes);
  - Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results;
  - Tabulation of instrument and method practical detection/quantitation limits;
  - Raw data quantification report for each sample;
  - A calibration data summary reporting calibration range used and a measure of linearity, where appropriate;
  - Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios;
  - Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample; and
  - Recovery assessments and a replicate sample summary, including post-digestate spike analysis; all MS data (including spike concentrations) for each sample, if accomplished; all MS results (recoveries and spike amounts); and laboratory control sample analytical results).

DOE should present summary tables of these data and Level II QA/QC results to NMED in the formats described in Appendix E of this Consent Order. The raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory support data for samples from this project, should be compiled and kept on file at the Facility for reference.

#### I.C.2. Review of Field and Laboratory QA/QC Data

DOE should evaluate the sample data, field, and laboratory QA/QC results for acceptability with respect to the DQOs. Each group of samples should be compared with the DQOs and evaluated using data validation guidelines contained in EPA guidance documents, the most recent version of SW-846, and industry-accepted QA/QC methods and procedures. DOE should contact NMED of laboratory notification of data quality exceptions that may affect the ability to meet the objectives of the investigation or compliance activity in order to discuss the implications and determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. DOE should summarize the results of the discussion with NMED regarding the data quality exceptions via email.

### I.C.2.a) Blanks, Field Duplicates, Reporting Limits and Holding Times

The analytical results of field blanks and field rinsate blanks should be reviewed to evaluate the adequacy of the equipment decontamination procedures and the possibility of cross-contamination caused by decontamination of sampling equipment. The analytical results of trip blanks should be reviewed to evaluate the possibility for contamination resulting from the laboratory-prepared sample containers or the sample transport containers. The analytical results of laboratory blanks should be reviewed to evaluate the possibility of contamination caused by the analytical procedures. If Contaminants are detected in field or laboratory blanks, the sample data should be qualified, as appropriate.

### I.C.2.b) Field Duplicates

Field duplicates should consist of two samples either split from the same sample device or collected sequentially. Field duplicate samples should be collected at a minimum frequency of ten percent of the total number of samples submitted for analysis. RPDs for field duplicates should be calculated. A precision of no more than 20 percent for duplicates should be considered acceptable for soil, rock, and sediment sampling conducted at the Facility. The analytical DQO for precision should be used for water duplicates.

### I.C.2.c) Method Reporting Limits

Method reporting limits for sample analyses for each medium should be established at the lowest level practicable for the method and analyte concentrations and should not exceed soil, groundwater, surface water, or vapor emissions background levels, cleanup standards, or screening levels. The preferred method detection limits are a maximum of 20 percent of the background, screening, or cleanup levels. Detection limits that exceed established soil, groundwater, surface water, or air emissions cleanup standards, screening levels, or background levels and are reported as "not detected" should be considered data quality exceptions and an explanation for the exceedance and its acceptability for use should be provided.

### I.C.2.d) Holding Times

DOE should review the sampling, extraction, and analysis dates to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers should be noted if holding times were exceeded.

## I.C.3. Representativeness and Comparability

### I.C.3.a) Representativeness

Representativeness is a qualitative parameter related to the degree to which the sample data represent the relevant specific characteristics of the media sampled. DOE should implement procedures to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. DOE should note any procedures or variations that may affect the collection or analysis of representative samples and should qualify the data.

### I.C.3.b) Comparability

Comparability is a qualitative parameter related to whether similar sample data can be compared. To assure comparability, DOE should report analytical results in appropriate units for comparison with other data (past studies, comparable sites, screening levels, or cleanup standards), and should implement standard collection and analytical procedures. Any procedure or variation that may affect comparability should be noted and the data should be qualified.

### I.C.4. Laboratory Reporting, Documentation, Data Reduction, and Corrective Action

Upon receipt of each laboratory data package, data should be evaluated against the criteria outlined in the previous sections. Any deviation from the established criteria should be noted and the data will be qualified. A full review and discussion of analytical data QA/QC and all data qualifiers should be submitted as appendices or attachments to investigation and monitoring reports prepared in accordance with Appendix E of this Consent Order. Data validation procedures for all samples should include checking the following, when appropriate:

- Holding times;
- Detection limits;
- Field equipment rinsate blanks;
- Field blanks;
- Field duplicates;
- Trip blanks;
- Reagent blanks;
- Laboratory duplicates;
- Laboratory blanks;
- Laboratory matrix spikes;
- Laboratory matrix spike duplicates;
- Laboratory blank spikes;
- Laboratory blank spike duplicates; and
- Surrogate recoveries.

If significant quality assurance problems are encountered, appropriate corrective action should be implemented. All corrective action should be defensible and the corrected data should be qualified.

## II. MONITORING WELL CONSTRUCTION REQUIREMENTS

### II.A. Types of Monitoring Wells

Three types of groundwater monitoring wells have been installed at the Facility: alluvial, intermediate, and regional wells. In addition, vadose zone monitoring wells may be required for subsurface vapor monitoring. Alluvial wells are shallow wells which monitor groundwater or the vadose zone in the alluvium located in the canyon bottoms. Intermediate wells monitor perched groundwater or the vadose zone beneath the Facility and generally extend from depths of approximately 100 to 700 ft below ground surface. Regional wells monitor the deep regional aquifer beneath the Facility and generally are deeper than 700 ft below ground surface.

The well construction, installation, and completion procedures for these wells differ because each well monitors a different stratigraphic horizon and at different depths. General drilling procedures are presented in Section II.B and monitoring well construction recommendations are presented in Section II.C of this Appendix (F).

### II.B. Drilling Methods

Groundwater and vadose zone monitoring wells and piezometers should be designed, constructed and developed in a manner which will most likely yield high quality samples, best enable the well to last the duration of the project, and best ensure that the well will not serve as a conduit for Contaminants to migrate between different stratigraphic units or aquifers. The design, construction, and development of monitoring wells should comply with the guidelines established in various EPA RCRA guidance, including, but not limited to:

- U.S. EPA, *RCRA Groundwater Monitoring: Draft Technical Guidance*, EPA/530-R-93-001, November, 1992;
- U.S. EPA, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September, 1986; and
- Aller, L., Bennett, T.W., Hackett, G., Petty, R.J., Lehr, J.H., Sedoris, H., Nielsen, D.M., and Denne, J.E., *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*, EPA 600/4-89/034, 1989.

A variety of methods are available for drilling, constructing, and developing monitoring wells. While the selection of the drilling, construction, and development procedures is usually based on the site-specific geologic conditions, the following issues should also be considered:

- Drilling should be performed in a manner that minimizes impacts to the natural properties of the subsurface materials.
- Contamination and cross-contamination of groundwater and aquifer materials during drilling and construction should be avoided.
- The drilling method should allow for the collection of representative samples of rock, unconsolidated materials, and soil.
- The drilling method should allow DOE to determine when the appropriate location for the screened interval(s) has been encountered.
- The drilling method should allow for the proper placement of the filter pack and annular sealants. The borehole diameter should be at least four inches larger in diameter than the

nominal diameter of the well casing and screen to allow adequate space for placement of the filter pack and annular sealants.

The drilling method should allow for the collection of representative vapor and groundwater samples. Drilling fluids (which includes air) should be used only when necessary and in a manner that minimizes impact to the surrounding formation and groundwater.

A brief description of the different drilling methods that may be appropriate for the construction of monitoring wells at the Facility follows. Many of these methods may be used alone, or in combination, to install monitoring wells at the Facility. While the selection of the specific drilling, construction and development procedures will usually depend on the site-specific geologic conditions, justification for the method selected should be provided through Drilling Work Plans to NMED for approval prior to commencing drilling.

#### II.B.1. Hollow-Stem Auger

The hollow-stem continuous flight auger consists of a hollow, steel shaft with a continuous, spiraled steel flight welded onto the exterior side of the stem. The stem is connected to an auger bit and, when rotated, transports cuttings to the surface. The hollow stem of the auger allows drill rods, split-spoon core barrels, Shelby tubes, and other samplers to be inserted through the center of the auger so that samples may be retrieved during the drilling operations. The hollow stem also acts to temporarily case the borehole, so that the well screen and casing (riser) may be inserted down through the center of the augers once the desired depth is reached, minimizing the risk of possible collapse of the borehole. A bottom plug or pilot bit can be fastened onto the bottom of the augers to keep out most of the soils and/or water that have a tendency to clog the bottom of the augers during drilling. Drilling without a center plug is acceptable provided that the soil plug, formed in the bottom of the auger, is removed before sampling or installing well casings. The soil plug can be removed by washing out the plug using a side discharge rotary bit, or augering out the plug with a solid-stem auger bit sized to fit inside the hollow-stem auger. In situations where heaving sands are a problem, potable water may be poured into the augers to equalize the pressure so that the inflow of formation materials and water should be held to a minimum when the bottom plug is removed. The hollow-stem auger method is best suited for drilling shallow overburden wells.

#### II.B.2. Air Rotary/Air Down-The-Hole Hammer/ODEX

The air rotary method consists of a drill pipe or drill stem coupled to a drill bit that rotates and cuts through soils and rock. The cuttings produced from the rotation of the drilling bit are transported to the surface by compressed air, which is forced down the borehole through the drill pipe and returns to the surface through the annular space (between the drill pipe and the borehole wall). The circulation of the compressed air not only removes the cuttings from the borehole but also helps to cool the drill bit. The use of air rotary drilling is best suited for hard-rock formations. In soft unconsolidated formations, casing is driven to keep the formation from caving. When using air rotary, the air compressor should have an in-line filter system to filter the air coming from the compressor. The filter system should be inspected regularly to insure that the system is functioning properly. In addition, a cyclone velocity dissipator or similar air containment/dust-suppression system should be used to funnel the cuttings to one location instead of allowing the cuttings to discharge uncontrolled from the borehole. Air rotary that

employs the dual-tube (reverse circulation) drilling system is acceptable because the cuttings are contained within the drill stem and are discharged through a cyclone velocity dissipator to the ground surface.

The injection of air into the borehole during air rotary drilling has the potential to alter the natural properties of the subsurface. This can occur through air-stripping of the VOCs in both soil and groundwater in the vicinity of the borehole, altering the groundwater geochemical parameters (e.g., pH and redox potential), and potentially increasing biodegradation of organic compounds in the aquifer near the borehole. These factors may prevent the well from yielding vapor or groundwater samples that are representative of in-situ conditions.

In hard, abrasive, consolidated rock, a down-the-hole hammer may be the more appropriate air rotary method. In this method, compressed air is used to actuate and operate a pneumatic hammer as well as lift the cuttings to the surface and cool the hammer bit. One drawback of the down-the-hole hammer is that oil is required in the air stream to lubricate the hammer-actuating device, and this oil could potentially contaminate the soil in the vicinity of the borehole and the aquifer.

The ODEX method is a variation of the air rotary method in which a casing-driving technique is used in combination with air rotary drilling. With the ODEX system, the drill bit extends outward and reams a pilot hole large enough for a casing assembly to slide down behind the drill bit assembly. As a result, casing is advanced simultaneously while drilling the hole.

### II.B.3. Water Rotary and Mud Rotary

The water and mud rotary drilling methods consist of rotary drilling techniques where water or drilling mud is used as the circulating fluid. In both methods, the circulating fluid is pumped down through the drill pipe and is returned back up the borehole through the annular space. The circulating fluid stabilizes the borehole, cools the drill bit, and carries the drill cuttings up to the surface. While the water and mud rotary drilling techniques are rapid and effective drilling methods, the recognition of water-bearing zones is hampered by the addition of water into the system.

Mud rotary drilling is similar to water rotary drilling with the exception that mud additives are added to the water to change the properties (e.g., density, viscosity, yield point, gel strength, fluid-loss-control effectiveness, and lubricity) of the circulating fluid. Drilling muds provide greater borehole stabilization than water alone. There are several types of mud presently available, including bentonite, barium sulfate, organic polymers, cellulose polymers, and polyacrylamides. While drilling muds enhance the stability of the borehole and allow for drilling in formations not appropriate to other methods, they can adversely affect the hydrologic properties and geochemistry of the aquifer. For example, drilling fluid invasion and the buildup of borehole filter cake may reduce the effective porosity of the aquifer in the vicinity of the borehole. In addition, bentonite drilling muds may affect the pH of groundwater and organic polymer drilling muds have been observed to facilitate bacterial growth, which reduces the reliability of sampling results. If polymer emulsions are to be used in the drilling program at the Facility, polymer dispersion agents should be used at the completion of the drilling program to remove the polymers from the boreholes. For example, if EZ Mud® is used as a drilling

additive, a dispersant (e.g., BARAFOS® or five percent sodium hypochlorite) should be used to disperse and chemically breakdown the polymer prior to developing and sampling the well.

#### II.B.4. Dual-Wall Reverse Circulation

The dual-wall reverse circulation drilling method utilizes a double-wall drill pipe and has the reverse circulation of other conventional rotary drilling methods. The circulating fluid (water or air) is pumped down the borehole between the outer and inner drill pipe, and returns up the inner drill pipe. Cuttings are lifted to the surface through the inner drill pipe. The inner drill pipe rotates the bit, and the outer drill pipe acts as a casing and stabilizes the borehole. Typically, a tri-cone bit is used when drilling through unconsolidated formations and a down-the-hole hammer is used in hard rock.

The dual-wall reverse circulation rotary method is one of the better methods available for obtaining representative and continuous formation samples while drilling. If a roller cone bit is used, the formation that is being drilled is located only a few inches ahead of the double-wall pipe. As a result, the cuttings observed at the surface represent no more than one foot of the formation at any point in time.

When drilling with air, an in-line filter should be used to remove oil or other impurities from the airstream. However, if a down-the-hole hammer is used, it should be used with caution since it requires oil in the airstream to lubricate the hammer. This could possibly introduce Contaminants to the borehole and aquifer.

#### II.B.5. Resonant Sonic

Resonant sonic drilling is a method that uses a sonic drill head to produce high-frequency, high-force vibrations in a steel drill pipe. The vibrations in the pipe create a cutting action at the bit face, which allows a continuous core of the formation to move into a core barrel. The method requires no drilling fluid, drills very fast (up to one ft/sec in certain formations), drills at any angle through most formations (rock, clay, sand, boulders, permafrost, glacial till), and yields virtually no cuttings in the drilling process. This drilling method has been tested by DOE and used at various DOE facilities.

#### II.B.6. Cryogenic

Cryogenic drilling is a technique that uses standard air rotary drilling methods, but employs cold nitrogen gas as the circulating fluid instead of compressed air. The use of nitrogen gas as the circulation fluid freezes the borehole wall while drilling, which stabilizes unconsolidated sediments and prevents potential cross-contamination of different water-bearing zones. In addition, the method produces fewer cuttings than liquid based drilling methods, requires minimal equipment modifications to existing drill rigs, and does not add Contaminants to the borehole during the drilling process due to the benign nature of nitrogen gas. The method is especially applicable for drilling through alternating hard (competent) and soft (unconsolidated) formations. This drilling method has been tested by DOE and proposed for future use at various DOE facilities.

## II.C. Well Construction/Completion Methods

### II.C.1. Well Construction Materials

Well construction materials should be selected based on the goals and objectives of the proposed monitoring program and the geologic conditions at the site. When selecting well construction materials, the primary concern should be selecting materials that will not contribute foreign constituents or remove Contaminants from the vadose zone or groundwater. Other factors to be considered include the tensile strength, compressive strength, and collapse strength of the materials; length of time the monitoring well will be in service; and the material's resistance to chemical and microbiological corrosion. Generally, if the monitoring program requires the analysis of organic Contaminants, stainless steel or fluoropolymer materials should be used. However, if the monitoring program requires only inorganic Contaminant analyses, polyvinyl chloride (PVC) materials may be used. PVC is less desirable for monitoring wells where organic Contaminants will be analyzed due to its potential for sorption and leaching of Contaminants. If stainless steel is used for monitoring wells where low levels of metals may be present, the steel must be passivated to minimize sorption and leaching of metals.

Well screen and casing materials acceptable for the construction of RCRA monitoring wells include stainless steel (304 or 316), rigid PVC (meeting American National Standards Institute/National Sanitation Foundation Standard 14), and fluoropolymer materials (polytetrafluoroethylene, fluorinated ethylene propylene, and polyvinylidene). In addition, there are other materials available for the construction of monitoring wells including acrylonitrile butadiene styrene (ABS), fiberglass-reinforced plastic (FRP), black iron, carbon steel, and galvanized steel, but these materials are not recommended for use in long term monitoring wells due to their low resistance to chemical attack and potential contribution of contamination to the groundwater. However, these materials may be used in the construction of monitoring wells where they will not be in contact with the groundwater that will be sampled (e.g., carbon steel pipe used as surface casing).

### II.C.2. Well Construction Techniques

#### II.C.2.a) Single-Cased Wells

The borehole should be bored, drilled, or augered as close to vertical as possible, and checked with a plumb bob, level, or appropriate downhole logging tool. Slanted boreholes should not be acceptable unless specified in the design. The borehole should be of sufficient diameter so that well construction can proceed without major difficulties. To assure an adequate size, a minimum two-inch annular space is recommended between the casing and the borehole wall (or the hollow-stem auger wall). The two-inch annular space around the casing will allow the filter pack, bentonite seal, and annular grout to be placed at an acceptable thickness. Also, the two-inch annular space will allow up to a 1.5-inch outer diameter tremie pipe to be used for placing the filter pack, bentonite seal, and grout at the specified intervals.

It may be necessary to overdrill the borehole so that any soils that have not been removed (or that have fallen into the borehole during augering or drill stem retrieval) will fall to the bottom of the borehole below the depth where the filter pack and well screen are to be placed. Normally, three to five ft is sufficient for overdrilling shallow wells. Deep wells may require deeper overdrilling.

The borehole can also be overdrilled to allow for an extra space for a well sump to be installed. If the borehole is overdrilled deeper than desired, it can be backfilled to the designated depth with bentonite pellets or the filter pack.

The well casings (riser assembly) should be secured to the well screen by flush-jointed threads or other appropriate connections and placed into the borehole and plumbed by the use of centralizers, a plumb bob, or a level. No petroleum-based lubricating oils or grease should be used on casing threads. Teflon tape can be used to wrap the threads to insure a tight fit and minimize leakage. No glue of any type should be used to secure casing joints. Teflon "O" rings can also be used to ensure a tight fit and minimize leakage. "O" rings made of materials other than Teflon should not be used if the well will be sampled for organic compound analyses. Before the well screen and casings are placed at the bottom of the borehole, at least six inches of filter material should be placed at the bottom to serve as a firm footing. The string of well screen and casing should then be placed into the borehole and plumbed. If centralizers are used, they should be placed below the well screens and above the upper transition sand so that the placement of the filter pack, overlying bentonite seal, and annular grout will not be hindered. Centralizers placed in the wrong locations can cause bridging during material placement. If installing the well screen and casings through hollow-stem augers, the augers should be slowly extracted as the filter pack, bentonite seal, and grout are tremied or poured into place. The gradual extraction of the augers will allow the materials being placed in the augers to flow out of the bottom of the augers into the borehole. If the augers are not gradually extracted, the materials will accumulate at the bottom of the augers causing potential bridging problems. After the string of well screen and casing is plumb, the filter material should be placed around the well screen (preferably by the tremie pipe method) up to the designated depth. After the filter pack has been installed, the bentonite seal should be placed directly on top of the filter pack up to the designated depth or a minimum of two ft above the filter pack, whichever is greater. After the bentonite seal has hydrated for the specified time, the annular sealant should be pumped by the tremie method into the annular space around the casings (riser assembly) up to within two ft of the ground surface or below the frost line, whichever is greater. The grout should be allowed to cure for a minimum of 24 hours before the surface pad and protective casing are installed. After the surface pad and protective casing are installed, bumper guards (guideposts) should be installed (if necessary).

#### II.C.2.b) Double-Cased Wells

Double-cased wells should be constructed when there is reason to believe that interconnection of two aquifers by well construction may cause cross contamination, or when flowing sands make it impossible to install a monitoring well using conventional methods. A pilot borehole should be advanced through the overburden and the contaminated zone into a clay, confining layer, or bedrock. An outer casing (surface or pilot casing) should be placed into the borehole and sealed with grout. The borehole and outer casing should extend into tight clay a minimum of two ft or into competent bedrock a minimum of one foot. The total depth into the clay or bedrock will vary depending upon the plasticity of the clay and the extent of weathering and fracturing of the bedrock. The size of the outer casing should be of sufficient inside diameter to contain the inner casing and the two-inch annular space. In addition, the borehole should be of sufficient size to contain the outer casing and the two-inch minimum outer annular space, if applicable.

The outer casing should be grouted by the tremie method from the bottom of the borehole to within two ft of the ground surface. The grout should be pumped into the annular space between the outer casing and the borehole wall. This can be accomplished by either placing the tremie pipe in the annular space and pumping the grout from the bottom of the borehole to the surface, or placing a grout shoe or plug inside the casing at the bottom of the borehole and pumping the grout through the bottom grout plug and up the annular space on the outside of the casing. The grout should consist of a Type I Portland cement and bentonite or other approved grout to provide a rigid seal. A minimum of 24 hours should be allowed for the grout plug (seal) to cure before attempting to drill through it. When drilling through the seal, care should be taken to avoid cracking, shattering, and washing out of the seal. If caving conditions exist so that the outer casing cannot be sufficiently sealed by grouting, the outer casing should be driven into place and a grout seal placed in the bottom of the casing.

#### II.C.2.c) Bedrock Wells

The installation of monitoring wells into bedrock can be accomplished in two ways. The first method is to drill or bore a pilot borehole through the soil overburden into the bedrock. An outer casing is installed into the borehole by setting it into the bedrock, and grouting it into place. After the grout has set, the borehole can be advanced through the grout seal into the bedrock. The preferred method of advancing the borehole into the bedrock is rock coring. Rock coring makes a smooth, round hole through the seal and into the bedrock without cracking or shattering the seal. Roller cone bits are used in soft bedrock, but extreme caution should be taken when using a roller cone bit to advance through the grout seal in the bottom of the borehole because excessive water and bit pressure can cause cracking, eroding (washing), and/or shattering of the seal. Low volume air hammers may be used to advance the borehole, but they have a tendency to shatter the seal because of the hammering action. If the structural integrity of the grout seal is in question, a pressure test can be utilized to check for leaks. If the seal leaks, the seal is not acceptable. When the drilling is complete, the finished well will consist of an open borehole from the ground surface to the bottom of the well. The major limitation of open borehole bedrock wells is that the entire bedrock interval serves as the monitoring zone.

The second method is to install the outer surface casing and drill the borehole into bedrock, and then install an inner casing and well screen with the filter pack, bentonite seal, and annular grout. The well is completed with a surface protective casing and concrete pad. This well installation method gives the flexibility of isolating the monitoring zone(s) and minimizing inter-aquifer flow. In addition, it gives structural integrity to the well, especially in unstable areas (e.g., steeply dipping shales) where the bedrock has a tendency to shift or move when disturbed.

#### II.C.3. Well Screen and Filter Pack Design

Well screens and filter packs should be designed to accurately sample the vadose zone interval or aquifer zone that the well is intended to target, minimize the passage of formation materials (turbidity) into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure. The selection of the well screen length depends upon the objective of the well. Piezometers and wells where only a discrete flow path is monitored are generally completed with short screens (two ft or less). While monitoring wells are usually constructed with longer screens (usually five to twenty ft), they should be kept to the minimum length appropriate for intercepting a Contaminant plume. The screen slot size should be selected to retain from 90 to

100 percent of the filter pack material in artificially filter packed wells, and from 50 to 100 percent of the formation material in naturally packed wells. All well screens should be factory wire-wrapped or machine slotted.

A filter pack should be used when: 1) the natural formation is poorly sorted; 2) a long screen interval is required or the screen spans highly stratified geologic materials of widely varying grain sizes; 3) the natural formation is uniform fine sand, silt, or clay, 4) the natural formation is thin-bedded; 5) the natural formation is poorly cemented sandstone; 6) the natural formation is highly fractured or characterized by relatively large solution channels; 7) the natural formation is shale or coal that will act as a constant source of turbidity to groundwater samples; or 8) the diameter of the borehole is significantly greater than the diameter of the screen. The use of natural formation material as a filter pack is only recommended when the natural formation materials are relatively coarse-grained, permeable, and uniform in grain size.

Filter pack materials should consist of clean, rounded to well-rounded, hard, insoluble particles of siliceous composition (industrial grade quartz sand or glass beads). The required grain-size distribution or particle sizes of the filter pack materials should be selected based upon a sieve analysis of the aquifer materials or the formation to be monitored, or the characteristics of the aquifer materials using information acquired during previous investigations.

Where sieve analyses are used to select the appropriate filter pack particle size, the results of a sieve analysis of the formation materials are plotted on a grain-size distribution graph, and a grain-size distribution curve is generated. The 70 percent retained grain size value should be multiplied by a factor between four and six (four for fine, uniform formations and six for coarse, non-uniform formations). A second grain-size distribution curve is then drawn on the graph for this new value, ensuring that the uniformity coefficient does not exceed 2.5. The filter pack that should be used will fall within the area defined by these two curves.

Once the filter pack size is determined, the screen slot size should be selected to retain at least 90 percent of the filter pack material. DOE may propose the use of a pre-determined well screen slot size and filter pack for monitoring wells in the site-specific work plans submitted to NMED.

The filter pack should be installed in a manner that prevents bridging and particle-size segregation. Filter packs placed below the water table should be installed by the tremie pipe method. Filter pack materials should not be poured into the annular space unless the well is shallow (e.g., less than 30 ft deep) and the filter pack material can be poured continuously into the well without stopping. At least two inches of filter pack material should be installed between the well screen and the borehole wall, and two ft of material should extend above the top of the well screen. A minimum of six-inches of filter pack material should also be placed under the bottom of the well screen to provide a firm footing and an unrestricted flow under the screened area. In deep wells (e.g., greater than 200 ft deep), the filter pack may not compress when initially installed. As a result, filter packs may need to be installed as high as five ft above the screened interval in these situations. The precise volume of filter pack material required should be calculated and recorded before placement, and the actual volume used should be determined and recorded during well construction. Any significant discrepancy between the calculated and actual volume should be explained. Prior to installing the filter pack annular seal, a one to two-ft layer of chemically inert fine sand should be placed over the filter pack to prevent the intrusion of annular sealants into the filter pack.

#### II.C.4. Annular Sealant

The annular space between the well casing and the borehole should be properly sealed to prevent cross-contamination of samples and the groundwater. The materials used for annular sealants should be chemically inert with respect to the highest anticipated concentration of Contaminants expected in the groundwater or vadose zone at the Facility. In general, the permeability of the sealing material should be one to two orders of magnitude lower than the least permeable parts of the formation in contact with the well. The precise volume of annular sealants required should be calculated and recorded before placement, and the actual volume should be determined and recorded during well construction. Any significant discrepancy between the calculated volume and the actual volume should be explained.

During well construction, an annular seal should be placed on top of the filter pack and any transition sand. This seal should consist of a high solids (10-30 percent) bentonite material in the form of bentonite pellets, granular bentonite, or bentonite chips. The bentonite seal should be placed in the annulus through a tremie pipe if the well is deep (greater than 30 ft), or by pouring directly down the annulus in shallow wells (less than 30 ft). If the bentonite materials are poured directly down the annulus (which is an acceptable method only in wells less than 30 feet deep), a tamping device should be used to ensure that the seal is emplaced at the proper depth and the bentonite has not bridged higher in the well casing. The bentonite seal should be placed above the filter pack a minimum of two ft vertical thickness. The bentonite seal should be allowed to completely hydrate in conformance with the manufacturer's specifications prior to installing the overlying annular grout seal. The time required for the bentonite seal to completely hydrate will differ with the materials used and the specific conditions encountered, but is generally a minimum of four to 24 hours.

A grout seal should be installed on top of the filter pack annular seal. The grout seal may consist of a high solids (30 percent) bentonite grout, a neat cement grout, or a cement/bentonite grout. The grout should be pumped under pressure (not gravity fed) into the annular space by the tremie pipe method, from the top of the filter pack annular seal to within a few ft of the ground surface. The tremie pipe should be equipped with a side discharge port (or bottom discharge for grouting at depths greater than 100 feet) to minimize damage to the filter pack or filter pack annular bentonite seal during grout placement. The grout seal should be allowed to cure for a minimum of 24 hours before the concrete surface pad is installed. All grouts should be prepared in accordance with the manufacturer's specifications. High solids (30 percent) bentonite grouts should have a minimum density of ten pounds per gallon (as measured by a mud balance) to ensure proper setup. Cement grouts should be mixed using six and one-half to seven gallons of water per 94-pound bag of Type I Portland cement. Bentonite (five to ten percent) may be added to delay the setting time and reduce the shrinkage of the grout.

#### II.C.5. Well Development

All groundwater monitoring wells should be developed to create an effective filter pack around the well screen, correct damage to the formation caused by drilling, remove fine particles from the formation near the borehole, and assist in restoring the natural water quality of the aquifer in the vicinity of the well. Development stresses the formation around the screen, as well as the filter pack, so that mobile fines, silts, and clays are pulled into the well and removed. Development is also used to remove any foreign materials (e.g., water, drilling mud) that may

have been introduced into the borehole during the drilling and well installation activities, and to aid in the equilibration that will occur between the filter pack, well casing, and the formation water. The development of a well is extremely important to ensuring the collection of representative groundwater samples.

Newly installed groundwater monitoring wells should not be developed for at least 48 hours after the surface pad and outer protective casing are installed. This will allow sufficient time for the well materials to cure before the development procedures are initiated. A new monitoring well should be developed until the column of water in the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. In most cases, the above requirements can be satisfied. However, in some cases, the pH, temperature, and specific conductivity may stabilize but the water remains turbid. In this case, the well may still contain well construction materials, such as drilling mud in the form of a mud cake or formation soils that have not been washed out of the borehole. Thick drilling mud cannot be flushed out of a borehole with one or two well volumes of flushing. Instead, continuous flushing over a period of several days may be necessary to complete the well development. If the well is pumped dry, the water level should be allowed to sufficiently recover before the next development period is initiated. The common methods used for developing wells include:

- Pumping and overpumping;
- Backwashing;
- Surging (with a surge block);
- Bailing;
- Jetting; and
- Airlift pumping.

These development procedures can be used, either individually or in combination, to achieve the most effective well development. However, the most favorable well development methods include pumping, overpumping, bailing, surging, or a combination of these methods. Well development methods and equipment that alter the chemical composition of the groundwater should not be used. Development methods that involve adding water or other fluids to the well or borehole, or that use air to accomplish well development should be avoided, if possible. If water is introduced to a borehole during well drilling and completion, then the same or greater volume of water should be removed from the well during development. In addition, the volume of water withdrawn from a well during development should be recorded.

#### II.C.6. Surface Completion

Monitoring wells may be completed either as flush-mounted wells, or as above-ground completions. A surface seal should be installed over the grout seal and extended vertically up the well annulus to the land surface. The lower end of the surface seal should extend a minimum of one foot below the frost line to prevent damage from frost heaving. The composition of the surface seal should be neat cement or concrete. In above-ground completions, a three-foot wide, four-inch thick concrete surface pad should be installed around the well at the same time the protective casing is installed. The surface pad should be sloped so that drainage will flow away from the protective casing and off the pad. In addition, a minimum of one inch of the finished

pad should be below grade or ground elevation to prevent washing and undermining by soil erosion.

A locking protective casing should be installed around the well casing (riser) to prevent damage or unauthorized entry. The protective casing should be anchored in the concrete surface pad below the frost line and extend several inches above the well riser stickup. A weep hole should be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing around the well riser. A cap should be placed on the well riser to prevent tampering or the entry of foreign materials, and a lock should be installed on the protective casing to provide security. If the wells are located in an area that receives traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five-foot length should be installed. The bumper guards should be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes should be filled with concrete to provide additional strength. The pipes should be painted a bright color to reduce the possibility of vehicular damage.

If flush-mounted completions are required (e.g., in active roadway areas), a protective structure such as a utility vault or meter box should be installed around the well casing. In addition, measures should be taken to prevent the accumulation of surface water in the protective structure and around the well intake. These measures should include outfitting the protective structure with a steel lid or manhole cover that has a rubber seal or gasket, and ensuring that the bond between the cement surface seal and the protective structure is watertight.

#### II.D. Well Abandonment

Wells may be abandoned when they are eliminated from the Facility monitoring network or when they are damaged beyond repair. Well plugging and abandonment methods and certification should be conducted in accordance with the *Rules and Regulations Governing Well Driller Licensing: Construction, Repair and Plugging of Wells* [19.27.4 NMAC]. DOE should notify NMED and submit a well abandonment plan to NMED prior to the date the wells are to be removed from the monitoring network.

The goal of well abandonment is to seal the borehole in such a manner that the well cannot act as a conduit for migration of Contaminants from the ground surface to the aquifer or between aquifers. To properly abandon a well, the preferred method is to completely remove the well casing and screen from the borehole, clean out the borehole, and backfill with a cement or bentonite grout, neat cement, or concrete.

For wells with small diameter casing, abandonment should be accomplished by overdrilling the well with a large diameter hollow-stem auger. After the well has been overdrilled, the well casing and grout can be lifted out of the ground with a drill rig, and the remaining filter pack can be drilled out. The open borehole can then be pressure grouted (via the tremie pipe method) from the bottom of the borehole to the ground surface. After the grout has cured, the top two-feet of the borehole should be filled with concrete to insure a secure surface seal.

Several other well abandonment procedures are available for wells with larger diameter screens and casings. One method is to force a drill stem with a tapered wedge assembly or a solid-stem

auger into the well casing and pull the casing out of the ground. However, if the casing breaks or the well cannot be pulled from the ground, the well will have to be grouted in place. To abandon a well in place, a tremie pipe should be placed at the lowest point in the well (at the bottom of the screen or in the well sump). The entire well is then pressure grouted from the bottom of the well upward. The pressurized grout will be forced out through the well screen into the filter pack and up the inside of the well casing sealing off all breaks and holes in the casing. Once the well is grouted, the casing is cut off even with the ground surface and covered with concrete.

If a PVC well cannot be abandoned due to internal casing damage (e.g., the tremie pipe cannot be extended to the bottom of the screen), it may be necessary to drill out the casing with a roller cone or drag bit using the wet rotary drilling method, or grind out the casing using a solid-stem auger equipped with a carbide tooth bit. Once the casing is removed, the open borehole can be cleaned out and pressure grouted from the bottom of the borehole upward.

## II.E. Documentation

All information on the design, construction, and development of each monitoring well should be recorded and presented on a boring log, a well construction log, and well construction diagram. The well construction log and well construction diagram should include the following information:

- Well name/number;
- Date/time of well construction;
- Borehole diameter and well casing diameter;
- Well depth;
- Casing length;
- Casing materials;
- Casing and screen joint type;
- Screened interval(s);
- Screen materials;
- Screen slot size and design;
- Filter pack material and size;
- Filter pack volume (calculated and actual);
- Filter pack placement method;
- Filter pack interval(s);
- Annular sealant composition;
- Annular sealant placement method;
- Annular sealant volume (calculated and actual);
- Annular sealant interval(s);
- Surface (grout) sealant composition;
- Surface (grout) seal placement method;
- Surface (grout) sealant volume (calculated and actual);
- Surface (grout) sealant interval;
- Surface completion and well apron design and construction;
- Well development procedure and turbidity measurements;
- Well development purge volume(s) and stabilization parameter measurements;

- Type and design and construction of protective casing;
- Well cap and lock;
- Ground surface elevation;
- Survey reference point elevation on well casing;
- Top of monitoring well casing elevation; and
- Top of protective steel casing elevation.