KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit
Air Force Environmental Compliance Program

January 2010

377 MSG/CEAN
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

40 CFR §270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

MICHAEL S. DUVALL , Colonel, USAF
Commander

CONTENTS

Section **Page**

FIGURES

TABLES

1. INTRODUCTION

This closure plan describes the activities necessary to close both the open detonation (OD) treatment and the former open burn (OB) unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). Until final closure of the unit is complete and has been certified and approved by the New Mexico Environment Department (Department) in accordance with the New Mexico Hazardous Waste Management Regulations, a copy of the approved Closure Plan and any revisions thereof shall be made available, upon request to the Department.

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of 20.4.1 NMAC 40 CFR §§264.112, 264.118 and 270.14(b) (13) and 20.4.1 NMAC Subpart V, 40 CFR Part 264 Subparts G, H and X.

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

1.3 Partial and Final Closure Activities

The last treatment event that occurred at the Former OB Unit was in May 2008. All treatment residues from this last treatment event have been removed from the unit. Kirtland AFB officially ceased operation of the Former OB unit on September 28, 2009 in accordance with the Stipulated Final Order No. HWB-09-00(CO) and Settlement Agreement. Partial closure of the Former OB Unit is anticipated to be completed in 2011. Final closure of the Former OB Unit and the OD Unit is not anticipated until 2050. Kirtland AFB will notify the Secretary of the NMED, in writing, at least 90 days prior to the date that partial closure activities at the Former OB Unit will commence. Partial closure activities at the Former OB unit will include:

- Removal of the OB structure, secondary containment curbing and equipment used at the Former OB Unit for hazardous waste treatment.
- Sifting of the soils in a 50 ft radius surrounding the Former OB Unit to remove scrap metal.
- Sifting of the soils in the earthen berm surrounding the Former OB Unit to remove scrap metal..
- Grading of the area.

Final closure activities for the Former OB Unit and the OD Unit are scheduled for 2050. Final closure will consist of: (1) Removal of soils at the OD unit that have contaminant concentrations

above industrial soil screening levels (SSLs) or demonstrating that no potential unacceptable risk to human health or the environment and (2) Sending any hazardous waste residues/contaminated soils to a permitted treatment, storage or disposal facility (TSDF). Final closure will be complete when:

- All hazardous waste has been treated at the OD unit, and the treatment residues have been sent to a permitted TSDF for proper management;
- All areas surrounding both the Former OB Unit and the OD Unit have been decontaminated or a successful demonstration of no unacceptable risk has been made;
- Final closure certification has been submitted to the NMED; and
- NMED has approved the closure.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The maximum extent of operations that will be open during the remainder of this permit is expected to include the OD Unit only. OD operations are expected to continue until 2050.

The maximum quantity of hazardous waste expected to be treated at the OD unit per year is 100,000 pounds net explosive weight (NEW).

1.5 Schedule for Closure

Final closure of the Former OB Unit and the OD Unit will proceed by the general schedule presented below:

TABLE X-1
Closure Schedule

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste	-90 Days
Advertise for proposals	-90 Days
Notify the Department that closure activities will commence	-90 Days prior to close
Receive proposals	-60 Days
Select contractor and award contract	-45 Days
Begin closure activities	Day 0
Obtain analysis of wash and rinse water from sampling equipment	Day 45
Obtain analysis of soil samples from soils	Day 45
Submit final report to the Department.	180 days after receiving final volume of hazardous waste

Note: The schedule above indicates calendar days from the beginning by which activities shall be completed. Some activities may be conducted simultaneously or may not require the amount of time listed.

1.6 Amendment of Closure Plan

If it becomes necessary to amend this Closure Plan, Kirtland AFB will submit, in accordance with applicable regulations (i.e., 20.4.1 NMAC 40 CFR §264.112 (c)) and the terms of the September 28, 2009 Stipulated Final Order and Settlement Agreement, a written notification of or request for a permit modification, as appropriate, describing any change in operation or unit design which affects this plan. The written notification or request will include a copy of the amended plan for approval by the Department. Kirtland AFB will submit a written notification of, or a request for, a permit modification.

1.7 Closure and Post-Closure Cost Estimate, Financial Assurance and Liability Requirements

Since the Kirtland AFB facility is a federal facility, it is currently exempt from the requirement to provide closure and post-closure care estimates and the requirements to provide financial assurance and liability insurance for closure and post-closure activities pursuant to 40 CFR Part 264, Subpart H.

1.8 Closure Certification

Within 60 days after completion of the final closure activities for the Former OB Unit and the OD Unit, Kirtland AFB will submit, via certified mail, a certification that the units have been closed in accordance with the specifications of the approved closure plan. The certification will be signed by a responsible representative of Kirtland AFB and by an independent, professional engineer registered in the State of New Mexico. Documentation supporting the independent, registered professional engineer's certification shall be furnished to the Department with the certification.

1.9 Closure Report

Upon completion of the final closure activities, a closure report shall be submitted to the Department. The report will document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities.
- Any significant variance from the approved closure plan and the reason for the variance.
- A summary of sampling data associated with closure.
- A quality assurance statement on the adequacy of the analyses and the decontamination demonstration.
- The location of the file of supporting documentation.
- Disposal location of all hazardous wastes.
- Certification of the accuracy of the report.

1.10 Survey Plat and Post-Closure Requirements

Upon final closure of the Former OB Unit and the OD unit, a survey plat will be submitted to the Department. In the event that closure performance standards cannot be achieved for the Former

OB Unit and the OD Unit, then a post-closure plan will be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

The first phase of closure will consist of a hazards survey of the Former OB Unit and the OD unit conducted by contractor health physics and industrial hygiene personnel and Kirtland AFB EOD personnel. The purpose of the survey will be to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey will provide the information necessary for health physics and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that will be required to perform closure. Any UXO identified during the hazard survey will be handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities will be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities will be required to wear PPE as specified by health physics and industrial hygiene personnel.

2.1 Open Detonation Unit

The OD Unit consists of a cleared area surrounded and delineated by an approximately two-ft high earthen berm. Detonations are conducted in pits measuring approximately 30 ft long, 15 wide and 12 feet deep. The Former OB Unit is located approximately 250 feet east of the OD Unit. Surface and subsurface soil and any scrap metal at the OD Unit will be characterized by sampling and analysis. Soil samples shall be conducted on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at 5 ft intervals (total of 4 samples per location). At a minimum, the grid will encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste. Any areas used as training shall be considered a part of the OD Unit for the purposes of establishing the sampling grid.

At the Former OB Unit, three samples on each side of the former unit will be collected within 25 feet of the Former OB Unit to a depth of 0-1 ft. At least three samples will also be collected from the base of the unit.

The tools and equipment used during the sampling will be cleaned with detergent and water and scraped as necessary to remove any residue. The wash water will be collected and analyzed. Arrangements will be made for disposal of all containerized wash waters into the City of Albuquerque's sewer treatment system. Otherwise, the wash water will be transported to a permitted disposal facility.

All of the PPE worn by personnel performing closure activities will be disposable; therefore, all PPE will be placed into containers and managed as hazardous waste. This waste will be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the Former OB Unit and the OD unit. All contained PPE wastes will be transported to a permitted facility for disposal.

2.2 Sampling Procedures

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) may

be used if conditions or experience show the alternate method to be more appropriate. All sampling procedures actually used will be annotated in the final closure report. Sampling will be conducted in accordance with procedures given in "Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA 600/2-80-018) or SW-846.

2.3.1 Soil Sampling

Because of the close proximity of the OD Unit to the Former OB Unit, continued operations of the OD Unit allow for the release of hazardous constituents to the surface soils at the Former OB Unit. Therefore, no soil sampling will be done during partial closure of the Former OB Unit. Soil sampling will be conducted when the OD Unit, located 250 feet west of the Former OB Unit, is closed. The following is a description of the sampling to be conducted when the OD Unit is closed: The sampling procedure outlined below will be used to determine the presence of hazardous constituents, if any, that have been deposited on the Former OB Unit and the OD Units, the leaching rate of the constituent(s), or the residue level(s) in the soil. The samples will be analyzed for the parameters listed in Table X-2, which include all of hazardous constituents of the regulated wastes that were burned or detonated at the Former OB Unit and the OD Unit. Volatile organics and semivolatile organics are not expected to be found due to the treatment process. If contamination above background is discovered at a 1-foot (0.3 m) depth, a 3-foot (0.9 m) grid centered on the locus of contaminated points will be sited, and additional soil samples will be collected until the area of contamination is defined at both the Former OB Unit and the OD Unit. If contamination is found at the outside grid sampling locations, the limits of the grids will be expanded to determine the horizontal extent of contamination.

Surface soil samples and a sample from the l-foot (0.3 m) depth will be collected with a wooden or Teflon® trowel or scoop. Disposable sampling tools will be used. In the event that NMED requests split samples, sufficient soils will be collected to provide split samples to the NMED representatives. Sampling will proceed as follows:

- Take small, equal portions of sample from the surface and at the l-foot depth.
- Place each sample in a sample container appropriate for the required analysis (see Tables X-5 and X-6).
- Cap the container, attach a label and seal, preserve as required, record in field logbook, complete the request for analysis and chain-of-custody forms, and deliver the samples to a certified laboratory for analysis.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method will be used to collect subsurface soil samples.

If analysis shows that soil contamination exists, all contaminated soils will be excavated and removed or a risk assessment performed to demonstrate that any contaminants remaining do not pose a threat to human health or the environment. If this demonstration cannot be made, a post closure plan will be submitted.

2.3.2 Liquid Sampling

Glass tubes will be used to sample liquids. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids.

2.4 Appropriate Sample Containers and Preservatives

Samples will be placed in containers compatible with the intended analysis and will be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements will be followed for all samples collected during the closure process.

2.5 Sample Handling and Documentation

Samples will be analyzed at a commercial NELAC certified laboratory. Each sample will be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form will be used to track samples from collection through analysis to ensure that analytical results can be attributed to specific closure activities or specific areas. The procedures followed during closure will be equivalent to those provided in SW-846 or the edition current at closure. Important aspects of the procedures are presented below. A chain-of-custody form will be prepared for all samples collected for laboratory analyses. The form includes:

- Sample number
- Signature of sample collector
- Date and time of sample collection
- Location at which sample was collected
- Type of waste (e.g., salt, brine, etc.)
- Signatures of persons who have samples in their possession.
- Dates and times of possession.

This form will be initiated at the point of sample collection and will then remain with the sample during transfer to the laboratory. The form will be completed upon receipt at the laboratory and returned to Kirtland AFB for inclusion in facility operating record. The chain-of-custody form will include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. The sample container must be sealed with a gummed paper seal attached to the container in such a way that the seal must be broken in order to open the container. The seal and sample tag must be completed with a waterproof pen. The sample label is necessary to prevent misidentification of samples and shall include the following information: a unique sample number; and sample collection date and time, sample location, sample type, depth, and description.

A closure sampling field log book will be kept and will contain all information pertinent to field surveys and sampling. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries will include:

- Purpose of sample
- Location of sampling (coordinates referenced to staked field points, if soil sample)
- Name and business address of person making log entry
- Number and volume of sample
- Description of each sampling location, sampling methodology, equipment used, etc.
- Date and time of sample collection
- Sample destination and transporter's name (name of laboratory, UPS, etc.)
- Map or photograph of the sampling site, if any

- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.)
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.)
- Collector's sample identification number(s)
- Signature of person responsible for the log entry.

Sampling situations vary widely. No general rule can be given as to the extent of information that must be entered in the log book. A good rule, however, is to record sufficient information so that someone can reconstruct the sampling situation without relying on the collector's memory. Documentation of sample acceptance at the laboratory must be provided to the EOD Range Commander following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers should be provided to the project manager. The laboratory is required to have procedures for minimizing cross contamination of samples and securing sample custody within the laboratory.

Closure samples will be analyzed by an approved laboratory. Samples will be packaged and shipped in accordance with DOT shipping requirements (49 CFR Parts 100-199, Transportation). The type of packaging will depend on the protection that must be provided during handling, shipping, and storage. The packaging requirements vary with sample type, media, hazardous substances present, analysis required, and handling and storage conditions. Proper packaging will include consideration of:

- Regulatory requirements
- Type and composition of inner packaging (e.g., plastic bags, metal cans, absorbent packing material, and frozen gel for preservation)
- Type and composition of overpacks (e.g., metal drum or plastic ice chest)
- Method of overpack sealing (e.g., custody tape)
- Marking and labeling of overpacks (e.g., laboratory address, any appropriate DOT hazard class label(s), and handling instructions).

Test methods for analysis of all samples will be performed according to procedures documented in the most current version of SW-846. Hazardous constituents associated with the regulated wastes treated at the Former OB Unit and the OD Unit are included in these analyses. Recommended analytical methods, detection limits, and instrumentation are provided in Table X-2 for metals analysis; in Table X-3 for organics, perchlorate, total petroleum hydrocarbons (TPH), total organic carbon (TOC), sulfides and pH analysis; and in Table X-4 for high explosives (HE) analysis. Minimum calibration, operation, quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation.

2.6 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of potentially contaminated media, a program to ensure reliability of analytical data is essential. Data reliability will be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses. Field QC activities will include collection of QC samples in addition to field documentation

requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table X-5 summarizes field QC sample requirements. Blanks and duplicate samples will be collected to determine potential errors introduced in the data from sample collection and handling activities. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated grading equipment will be collected and analyzed. At least one rinsate blank will be collected for every ten samples. Duplicate samples will be collected at a frequency of one duplicate sample for every ten field samples. In no case will less than one rinsate blank or duplicate sample be collected for a sampling effort. These blank and duplicate samples will be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses will be compatible with the most recent version of SW-846 or other applicable EPA guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of SW-846. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table X-6 lists laboratory QC procedures by analytical methods.

The analytical laboratory will use the following criteria for data validation:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

2.7 Decontamination Verification

Sufficient sampling and analysis will be required to demonstrate that hazardous waste residues are not present at the site after closure. Soil and wash water samples will be analyzed for parameters listed in Tables X-2, X-3 and X-4 to verify the presence or absence of hazardous waste contamination. If the extent of soil contamination at the site is such that clean closure cannot be achieved, a post-closure care plan will be prepared to address the hazardous constituents remaining at the site. The analytical results from these samples will provide background data for decontamination verification. Used washdown solutions will also be analyzed for the same parameters listed in Tables X-2, X-3 and X-4. Equipment will be considered to be contaminated if the used wash-water solutions show a significant increase in the analytical parameters over the clean wash solution. A significant increase is determined using statistical methods defined in SW-846. Successful decontamination is defined as:

- No detectable hazardous constituents in the final samples, or
- Detectable hazardous constituents in the final samples are equal to or less than, at the 0.01 confidence level, their concentration in the unused wash water or background sample.

For metals, background soil concentration levels that will be used for comparison to soil contaminant concentrations are contained in "*Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project*

and the Kirtland Air Force Base Installation Restoration Program" (IT Corporation, 1996). If analysis for metals shows that the soil is contaminated with concentrations which are above background, the results will then be compared to the most current NMED and EPA industrial soil screening levels (SSLs). All other soil contaminant concentrations will also be compared to the most current NMED and EPA industrial SSLs. If the levels of hazardous constituents in the soils exceed the most current NMED and EPA industrial SSLs, additional soils will be excavated and removed, or a risk assessment will be prepared for each constituent showing a significant increase over samples collected from the area. A copy of the completed risk assessment, along with pertinent supporting data, will be provided to NMED for review and approval.

An alternative demonstration of decontamination may be proposed and justified at the time of final closure of the Former OB Unit and the OD Unit, as circumstances indicate. The Secretary of the NMED will evaluate the proposed alternative in accordance with standards and guidance then in effect and, if approved incorporate the alternative into the Closure Plan.

3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the Former OB Unit and the OD Unit include: excess soil from sampling; decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings will be replaced in the auger holes. The volume of liquid waste generated during the cleaning of excavation and grading equipment will be minimized by only using the amount of wash water and rinse water necessary to achieve successful decontamination. Solvents will not be used. This approach will help minimize the amount of liquids that cannot be disposed of in the sanitary sewer system.

3.1 Waste Management

Wastes associated with closure activities at the Former OB Unit and the OD Unit will be managed as follows:

- Wastes will be stored in appropriate containers that are compatible with the wastes and are in good condition.
- Waste containers will remain under the control of the personnel generating the waste.
- Waste containers will be segregated according to the compatibility and chemical waste type.
- Waste will be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid will be provided with secondary containment.
- Waste containers will be managed in such a manner as to prevent ruptures and leaks.
- Waste containers will be labeled appropriately, pending receipt of analytical results. Labels will be filled out appropriately and marked using permanent marker or pen. Label information will include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

If analytical results indicate that the waste is hazardous or the Kirtland AFB project manager determines that the waste will be classified as hazardous, Kirtland AFB will determine the appropriate storage and disposal procedures in accordance with 20.4.1 NMAC 40 CFR Parts 262 and 264 and Kirtland AFB RCRA Operating Permit. The hazardous waste from closure activities will be stored appropriately, pending determination of final disposal.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the Former OB Unit and the OD Unit will be based upon the results of sampling and analysis. Decontamination water will be analyzed for the constituents listed in Tables X-2, X-3 and X-4. PPE will be managed as a hazardous waste and will be managed appropriately.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous will be managed appropriately for subsequent disposal, as determined by the Kirtland AFB CEAN Office. Wastes characterized as nonhazardous (e.g., decontamination liquids) will be evaluated to determine the appropriate disposal method.

4. REFERENCES

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 1980, "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA-600/2-80-018, U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, Cincinnati, OH.

IT Corporation, 1996, "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project and the Kirtland Air Force Base Installation Restoration Program," prepared for Sandia National Laboratories/New Mexico Environmental Restoration Department 7585, Albuquerque, NM.

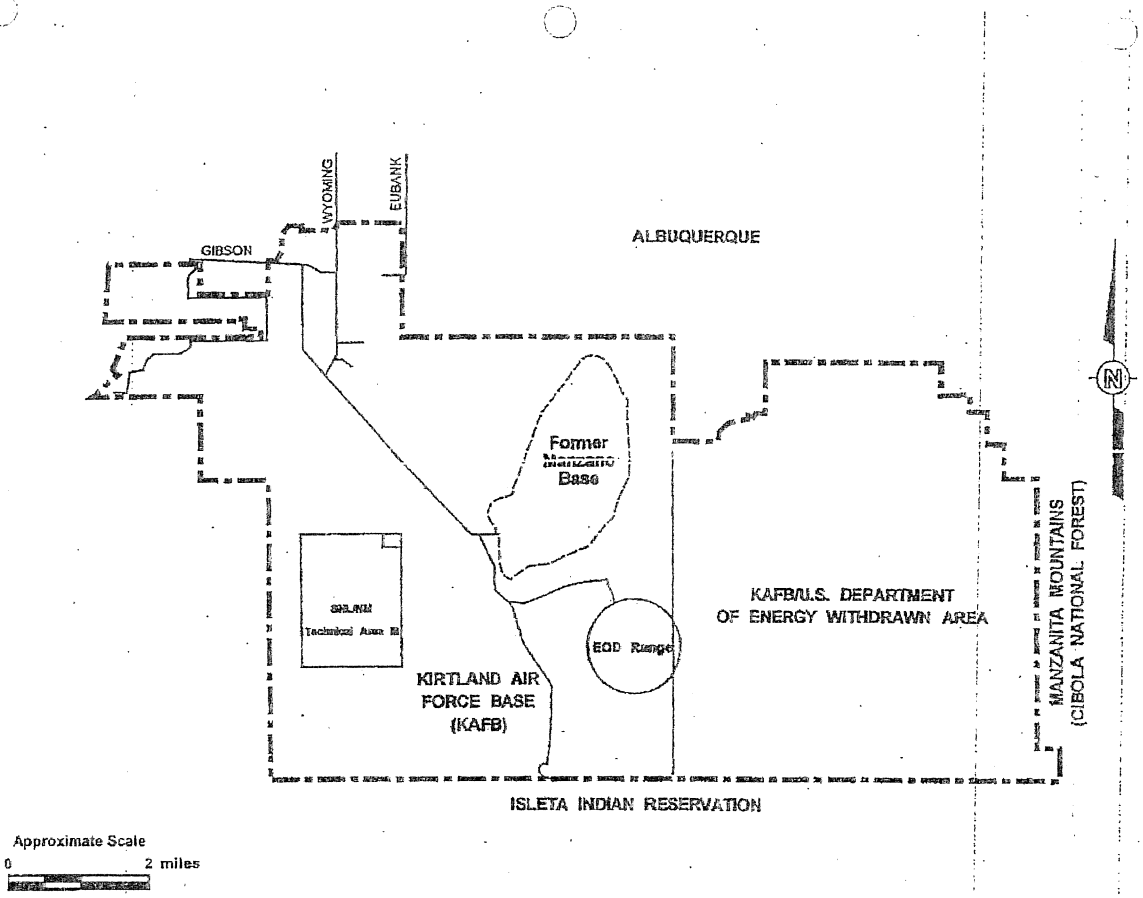

Figure X-1
Location of the EOD Range, Former Open Burn Unit and the Open Detonation Unit
At Kirtland Air Force Base

Figure X-2
Location of Former Open Burn Unit and the Open Detonation Unit at the EOD Range