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KAFB
Broken Mg Switch
Remediation

91/92

Environmental Consulting Services

Emissions Testing Services

Quality Assurance Services

ETEC

WORK PLAN

KAFB 03 9

WORK PLAN

PREPARED FOR:
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ALBUQUERQUE, NEW MEXICO

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1.0 INTRODUCTION

1.1 Mercury Remediation Work Plan, Health and Safety Plan,and Quality Assurance Project Plan

This Work Plan (WP) describes the plans and procedures that will be utilized to investigate and remediate building 30110 located on Kirtland Air Force Base (KAFB). A broken mercury switch has released mercury in the building and to the environment. An overview of the health and safety aspects of this project are discussed in this WP, and in much greater detail in Kirtland Air Force Base Mercury Remediation Project Health and Safety Plan (HSP). An overview of project quality control and quality assurance objectives are also presented in this Work Plan and are addressed in detail in the Kirtland Air Force Base Mercury Remediation Project Quality Assurance Project Plan (QAPjP). The HSP and QAPjP accompany this document.

1.2 Statement of the Problem

The Air Force has found that a mercury spill occurred at building 30110. The release occurred when mercury switches that are used to control water flow in the pumping station accidently broke. The spill was located in a basement on the southwest corner of the building. The initial mercury has been recovered, however some of the spill has been released into a field west of the building via a drain pipe at the bottom of the basement.

1.3 Project Description

This project will consist of two primary phases that are discussed in greater detail in section 4 of this Work Plan. .

Phase I will include the following tasks:

Preparation of the site per the site H&S Plan.

Construction of a retention pond to control the contaminated water release.

Remediation of the grossly contaminated soils.

Collection of samples to determine naturally occurring background mercury concentrations.

Removal of the contaminated drain pipe and associated soils.

Phase II will include the following tasks:

Screening the site for Hg contamination

Excavation of soils

Contaminated soil disposal

Sample collection for verification

Site restoration

1.4 Project Objectives

Project objectives include

Identification of all locations near-building 30110 at which mercury contamination may exist

Implementation of a corrective action program that will result in affected areas being clean and free of mercury

Protection of employees from possible adverse health effects of mercury

Compliance with all relevant environmental regulations

2.0 BUILDING AND AREA BACKGROUND AND DESCRIPTION

2.1 Building 30110

The building is located in the southeast quadrant of KAFB. The building is used as a water pumping station to supply water to the Manzano complex. There are three pumps located in the upper section building and a 33,980 gallon water reservoir under the north side of the building. The water control valves for both the water supply to the pumps and to the piping going on up the hill are located in a basement vault in the southeast corner. During the initial spill cleanup the mercury was found on the concrete floor in this vault. The vault in approximately 6 feet X 6 feet and 8 feet high, with a drain hole located in the center on the floor. When the pumps are operating the vault fills with water, due to overflow in the system.
The water is allowed to drain out via the drain pipe to a field below. The pipe runs approximately 150 feet to the west under the ground and exits into a field.

2.2 Drain Field Description

The drain pipe exits into the field approximately 10 vertical feet downslope of the basement. The field is at the northeast corner of the Peacekeeper Obstacle Course. The course is used in training and as a competition course for police training.

A preliminary review of the geology, indicates a formation of fine caliche non-plastic sands and disintegrating granites on the surface and as the hill continues downslope, some alluvial can be found on a clay bed. The clay layer begins any where from 6 inches to 5 feet below the surface. The total vertical drop from the building to the highway is 20 feet. At the outflow of the drain pipe a area of standing water 2 feet wide and 10 feet long was present during the initial site inspection. The soil was wet for another 20 feet down the hill, west of the standing water and Jerome 411 vapor analysis indicated that the contamination continued on the surface for another 100 yards.

2.3 Environmental Characterization

A preliminary survey by **ETEC INC.** identified two areas at which visible mercury has been observed. Those are the outflow of the drain pipe and the floor of the basement. It should reasonably be expected that the drain pipe will also contain liquid mercury. The area downslope of the standing water has provided vapor reading in the .199 Mg/M^3 range. The elevated reading continue along the natural drainage and can be range as high as .034 Mg/M^3 approximately 100 yards downslope.

3.0 REGULATORY STATUS AND REQUIREMENTS

On Monday, June 8, 1992, KAFB notified the New Mexico Environment Department (NMED), Hazardous and Radioactive Bureau. The NMED is the regulatory authority in New Mexico that oversees assessment and corrective action activities at mercury contaminated sites such as these.

Soil contaminated by elemental mercury is a Resource Conservation and Recovery Act (RCRA) Characteristic Waste (D009) if 0.2 mg/l or more of mercury is contained in an extract derived as a result of testing of the material by the Toxicity Characteristic Leaching Procedure (TCLP). Mercury-contaminated soil is a RCRA hazardous waste as described in 40 CFR Part 261.24; therefore, soils containing mercury must be managed as RCRA hazardous wastes.

The State of New Mexico has set a cleanup standard of 15 ppm Total mercury in soils where mercury spills have occurred. To characterize areas to determine where remediation will be required soil samples will be collected for laboratory analysis. Samples results with total mercury levels above 15 ppm will be remediated. To verify that soils remaining at the site can be clean closed, the contractor will collect verification samples. Each sample will consist of material collected from 5 separate locations in a remediated grid, and the five samples will be composited. This composite sample will be analyzed using Total Mercury Analysis, SW-846 method 7471 and the concentration of mercury must be less than 15 ppm in order for the site to be considered clean.

All soil removed from the site must be characterized using the TCLP analytical method, prior to disposal. Soils with levels below 0.2mg/l will be transported to a Hazardous Waste Landfill in bulk form, since technically they are not characterized waste. Soils with levels above 0.2 mg/l will be characterized as "D009" Hazardous Waste and treated to reduce the levels to below 0.2 mg/l prior to shipment.

4.0 WORK PLAN RATIONALE AND APPROACH

4.1 Phase I Remediation of Gross Contamination Areas

4.1.1 Construction of Retention Pond

The goal of this task is to mitigate the flow of water from the drain pipe, to avoid the continued spread of mercury. Soil samples will be collected from all areas where the ponds or pits will be constructed prior to use. A drainage channel will be cut upslope of the ponds to ensure that potential storm runoff will not integrate the site. Pond number 1 will be located 7 vertical feet downslope of the present standing water. Pond number 1 will be constructed by excavating a hole 15 feet by 15 feet, 5 feet deep. The pond will be lined with 3 layers of 10 mil plastic over lapping the bermed sides and a layer of 80 mil plastic ober the top,held in place with soil. The standing water will then be allowed to drain into the pond.

The soil previously covered by the standing water will be excavated and placed in a second lined and bermed pit, where evaporation can occur. Any moisture remaining in the soil after evaporation will be stabilized with bentonite.

This will allow the water in the surrounding soil to drain into the excavated hole, so it can also be pumped into the retention pond for evaporation.

Note: Is SAND going to be placed under plastic liner?

4.1.2 Remediation of Gross contaminated Soils

Soils where field vapor analysis indicate levels above .030 Mg/M3 will be considered to contain total mercury concentrations that may be capable of contributing to the immediate spread of mercury. These soils will be excavated and placed in fiberglass hazardous waste disposal bags and kept on-site until the TCPL results are available. The excavation techniques will include:

Front-end loader, to stockpile the soil on plastic

Backhoe, to load the soil into the bags and to move them to the storage area

4.1.3 Remediation of the Drain Pipe

While the soils in the grossly contaminated zones are being removed, the soils above the drain pipe will be excavated to facilitate removal of the pipe. The soil around the pipe will be removed to allow plastic to be pulled under the pipe and then wrapped securely and taped. Another layer of plastic will be pulled under the covered pipe, so that the pipe can be cut without the contamination in the pipe spreading to possibly uncontaminated soils. After the pipe is cut into 3 feet sections, it will be placed in the fiberglass bags for storage. The bags will remain on-site until a sample of the sludge inside the pipe can be analyzed. The pipe will be disposed of with the soils.

4.1.4 Background Soil Samples

Samples will be collected to define the background mercury concentration in the general area of the spill. The number of and the locations where the samples will be collected, should be determined by an agreement between the KAFB environmental division and the NMED. These samples will be analyzed to define the total mercury level present in the naturally occurring soils. Cleanup levels will not attempt to cleanup soils to levels below the background concentrations.

4.2 PHASE 2 SCREENING AND CONTINUED REMEDIATION

4.2.1 Screening Site for Hg Contamination

The areas that do not have vapor readings above the .030 Mg/M3 will be divided into grids of twenty feet and 5 surface soil grab samples will be composited for analysis, using one of the techniques outlined below. One soil boring per grid will be drilled for split spoon sampling to a depth 10 feet, with grab samples collected at 5 and 10 feet. These samples will be field screened using the Portable X-ray Florescent.

If your going to go to lab. why use the X-ray equip?

Grids that pass the field screening criteria will be sampled for laboratory analysis to verify clean.
Several field screening devices are available that will detect mercury in the soils.

Portable X-ray Florescent- If properly calibrated, the field- portable XRF produces reasonably accurate, virtually instantaneous measurements. The technique has been used by the EPA as a screening tool to determine heavy metal concentrations in soils at hazardous waste sites and can detect levels of total mercury as low as 5 ppm.

A. Soil samples will be collected from the grids and analyzed in the mobile van housing the XRF. Approximately 30 to 40 samples per day can be analyzed with this instrument. The results will be recorded on the Grid Map.

Mercury Vapor Analyzer- The MVA will be useful as a qualitative screening tool to detect the presence of mercury in soils, and it is relatively easy to operate. However, factors affecting the variability of mercury volatilization (temperature, soil type, porosity, permeability, pattern of mercury distribution in soils, etc.) must be considered when using the MVA as a screening tool.

Although the Jerome 411 or 431 Mercury Vapor Analyzer can be used as a *quantitative* instrument, for the purpose of detecting the presence of mercury in air , KAFB will use this instrument in a *qualitative* manner. In other words, as an initial screening instrument, the MVA will tell us either mercury is present or it is not detected. Specifics of the instrument are as follows:

Range - 0.000 to 1.999 mg/m3
Detection limit - .003 mg/m3
Accuracy - +/- 5% at .107 mg/m3
Precision - 5% Relative Standard Deviation at .107 mg/m3

The **Calibration and Maintenance Procedures and Frequency** proposed for this instrument is presented in Section 8.0 of the **Quality Assurance/Quality Control Project Plan.** The manufacturer specifications will also be included as an Appendix in the QA/QC Plan.

A. The initial undisturbed soil screening will be taken using a Jerome 411 or 431. A Mercury Vapor Analyzer (MVA) will be used both to determine initial ambient mercury vapor concentration of the soil. Air will be checked for ambient concentrations of mercury at both head height and near ground level. When utilized as a soil screening tool, a short length of flexible plastic tubing will be attached to the probe end of the instrument, and the opposite end of the tubing will be pressed over the throat of a small plastic funnel. The inverted funnel will then be placed directly upon the soil at multiple locations in the grid. Mercury vapor measurements will be documented on the Grid Map. The funnel will serve to both concentrate and prevent dispersion of mercury vapor as it emanates from the soil. This procedure may significantly increase the sensitivity and usefulness of the MVA as a screening tool for detecting mercury in soil. Ambient concentration will be used to determine the required PPE levels for the remediation crews and will be recorded in the Health & Safety field logbook.

B. If no contamination is found during the initial screening, the soil will be turned over, using a shovel, to a depth of 10 inches, mixed and the screening conducted again.

C. Should no contamination be found after the second screening process a composite verification sample will be collected for laboratory analysis. **"No contamination"** will be defined as; a detection of less than 0.003 mg/m3 in the 10 second sweep mode of operation for the Jerome 411 or 431.

D. If the laboratory analysis indicates levels of mercury below the action levels of 15ppm, or at the background levels the grid will be assumed to be clean and no remediation will be required.

4.2.2 Evaluate Disposal, Treatment, and Mercury Recovery Options

The method or methods selected to dispose of or treat contaminated soil will be based upon such considerations as total volume of contaminated soil generated during this project, cost-effectiveness, permanence of the solution, acceptance by regulatory authorities, and relative effectiveness in minimizing future liabilities. Methods evaluated or considered included:

Excavation and transport to a hazardous waste landfill - At present, mercury-contaminated soil may be disposed of in approved hazardous waste landfills without any pre-treatment, if the soil does not fail the TCLP test. However, RCRA Characteristic Wastes, those failing the TCLP test, including mercury-contaminated soil (D009), are subject to the Land Disposal Restrictions (LDRs). Since May 8, 1992, the LDRs has required pre-treatment of mercury-contaminated soil prior to placement in a hazardous waste landfill. The LDR treatment level is 0.2 mg/l mercury in the TCLP extract. Although the exact amount of soils requiring remediation is unknown at this time, it is anticipated that some of may fail the TCLP and be subject to the LDR.

On-site stabilization - Samples of stabilized material will be subjected to the TCLP to determine if the extract contains less than 0.2 mg/l mercury. If this technique is successful and is chosen as a remedy, contaminated soil will be excavated, treated on-site in a mobile treatment unit, and either placed back into the excavation from which it was taken or transported to a solid waste landfill if deemed necessary.

On- or off-site retorting of soil to recover mercury - Retorting involves heating contaminated soil to vaporize the mercury, followed by recovery through distillation. This option will be considered, although it is anticipated that this is not a feasible method due to cost, energy requirements, and air emissions control problems.

KAFB has chosen to transport and dispose of the mercury contaminated soil in an approved hazardous waste landfill.

4.2.3 Excavate Contaminated Soil

Most of the contaminated soil will be removed with mechanical equipment. A backhoe will be used to dig the ponds and trenches and to load the fiberglass bags. A frontend loader will be used to move the majority of the soil to a stockpile where it can be loaded onto the disposal trucks. Since highly contaminated soil are to be disposed in fiberglass sacks, these bags will be stacked to facilitate TCLP sampling. The Method Detection Limit (MDL) will be used. If mercury is detected the remediation is continued. If mercury is not detected, a verification sample will be collected.

4.2.4 Verification Sample

To verify that each grid is clean, a five-part composite soil sample will be collected and submitted for a Total Mercury analysis. Composite fractions will be collected from the following locations of the grid or within the excavation:

One fraction will be collected from the center of the grid or excavation..Four additional fractions will be collected from separate locations six inches inside the corners of the grid or excavation.

If the excavation exceeds five feet in depth, or if the walls of the excavation appear unstable, a hand auger will be used to retrieve sample fractions so that personnel can avoid the risk of entering a steep-walled pit that may possibly cave-in.

Some verification samples may contain in excess of the allowable amount of Total mercury, which means that additional soil will need to be removed from the grid or excavation.

4.2.5 Decontamination Procedures

Upon conclusion of each round of excavation or screening activities, all reusable personnel protective clothing, sampling and excavating equipment, and tools will be decontaminated in the Contamination Reduction Zone according to procedures described in the HSP and the QAPjP. These procedures have been designed to effectively decontaminate clothing and equipment and to minimize the volume of waste generated by decontamination activities that must be managed and disposed of as hazardous waste. Clothing that will not be reused (Tyvek\Sarnyk suits and inner gloves) will be placed in a plastic bag and will be disposed of as hazardous waste.

4.2.6 Fill Excavations With Clean Or Treated Soil

This material will be obtained from field locations that are selected on the basis of availability of material and proximity to the site. Fill soil will be sampled initially (using both TCLP and Total Mercury) to verify that it is mercury-free, or that is does not contain mercury in excess of naturally occurring background levels.

4.2.7 Off-site Disposal of Contaminated Soil

Sacks or disposal units of contaminated soil will be transported from the site and will be transferred to end-dump trailers for immediate transport to disposal sites.

5.0 HEALTH AND SAFETY CONCERNS AND PROCEDURES

5.1 Health and Safety Plan

The HSP has been prepared to protect mercury remediation project workers from physical and chemical hazards associated with mercury cleanup activities. This plan is presented with this report as a separate document. Major elements of the HSP are discussed in the following sections.

5.2 Hazard Assessment

Mercury - Inhalation of mercury vapor and dust particles that may be coated with mercury and, to a lesser degree, contact with elemental mercury resulting in absorption through the skin are the primary hazards that will be encountered during this project.

Elemental mercury is a silvery liquid at normal temperatures. Mercury vapor is colorless and odorless. Mercury can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It may enter the body through the skin. Short-term exposure to inhaled mercury vapor may cause headaches, cough, chest pains, chest tightness, and difficulty in breathing. It may also cause chemical pneumonitis (fluid retention in the lung due to irritation). In addition, it may cause soreness of the mouth, loss of teeth, nausea, and diarrhea. Liquid mercury may irritate the skin. Long-term exposure to mercury liquid or vapor causes problems that develop gradually. The first effects to occur are often fine shaking of the hands, eyelids, lips, tongue, or jaw. Other effects are allergic skin rash, headache, sores in the mouth, sore or swollen gums, loose teeth, insomnia, excess salivation, personality change, irritability, indecision, loss of memory, and intellectual deterioration.

5.3 Personnel Protective Clothing and Equipment

Sampling or excavating mercury contaminated soil may generate hazardous concentrations of mercury vapor and dust; therefore, protective clothing and equipment will be worn during these activities. Protective clothing and equipment include a hardhat, safety goggles or glasses, a full-face respirator equipped with two mercury vapor cartridges, Tyvek\Sarnyk coveralls, latex rubber gloves and over-boots, and steel-toed boots.

5.4 Medical Monitoring Program

To verify that all contract personnel actively involved in investigative and corrective action activities begin work on this project without an excessive body burden of mercury, to be sure site personnel are not exposed to excessive amounts of mercury during the project, and to ensure that personnel protective equipment is adequately protecting personnel, a medical monitoring program will be initiated. Testing will include:

Initial urinalysis screening of candidates, followed by a baseline medical exam for those chosen to work on the project

Monthly mercury urinalyses for workers actively participating in remedial activities

Annual physical exam, including a mercury blood serum test

Medical examinations and urinalyses will be performed by, or under the supervision of, a licensed physician, whose information and opinion will be released to appropriate KAFB personnel.

5.5 Contamination Control Zones

To prevent the spread of mercury from contaminated to clean areas during remedial activities, three contiguous zones will be established around where the contaminated area.
The three zones are:

The **Exclusion Zone**, the innermost of the three areas, is the area where contamination exists. This area is restricted to entry by personnel in the appropriate PPE level.

The **Contamination Reduction Zone** lies beyond the outer boundary of the Exclusion Zone and provides a transition area between contaminated and uncontaminated areas. It is initially considered to be a non-contaminated area. Two subareas are established in this zone: one for decontamination of personnel and one for excavation and sampling equipment. The Contamination Reduction Zone will generally consist of a rectangular area about 20′ by 30′ in size.

The outermost zone is the **Support Zone** and is considered a non-contaminated or clean area. Support vehicles and equipment are located in this zone. Since normal work clothes are appropriate within this zone, potentially contaminated personnel clothing, equipment, and samples are not permitted in this area. Instead, they are left in the Contamination Reduction Zone until they are

decontaminated or properly containerized.

5.6 Decontamination Procedures for Personnel and Equipment

The decontamination procedure for personnel protective clothing and equipment that is to be reused is described in the HSP. This procedure is designed to minimize fluids and solid waste that might potentially be managed as hazardous waste.

5.7 Personnel Health and Safety Training

As specified in 29 Code of Federal Regulations (CFR), Part 1910.120, all personnel participating in mercury site investigations or remediations will be required to complete the 40-hour personnel protection and safety course or the 8-hour annual refresher if the 40- hour course was completed more than 1 year from the start of any work on this project. In addition, site supervisors must complete the 8-hour supervisors training course and must have participated in at least 24 hours of supervised on-the-job training. In addition, one member of the remedial crew must be trained in First Aid and Cardio-Pulmonary Resuscitation (CPR).

29 CFR - 1910-134

6.0 DATA QUALITY OBJECTIVES AND SAMPLING PROCEDURES

The KAFB recognizes that successful execution of this project requires strict adherence to a formal Quality Assurance and Quality Control (QA/QC) program. The primary objective of the QA/QC program is to ensure the production of reliable, representative, repeatable, comparable, precise, and complete data that will withstand legal challenge. Project-specific QA/QC objectives and goals, and sample collection and handling procedures are contained in the Quality Assurance Project Plan (QAPjP), which is provided with this report as a separate document. Key elements of the QAPjP are briefly described in the following sections.

6.1 Field Activities Documentation

Complete and detailed documentation must be generated that fully describes all field activities for the purpose of addressing future regulatory and possible legal issues that may arise regarding project activities. Project documentation will include:

Quality Assurance Field Logbooks - (QAFL) All field screening instrument readings, inspection observations, and sampling and excavation activities will be recorded in the (QAFL).As required sketch will be completed that illustrates the maximum extent of the excavated area and the locations and depths from which the five verification sample fractions were collected.

If follow-up remedial work is required at a grid, additional records of the work will be footnoted to the previous page.

Field Procedures Book (FPB) - The Field Procedures Book will be a step by step process that defines the actual investigation and remediation activities. A FPB will reside with every crew as well as any oversight officers monitoring the project.

6.2 Data Gathering and Sample Collection Procedures

A mercury vapor analyzer (MVA) will be used both to determine initial mercury vapor concentrations and in remediation as a screening tool to detect soil with non-visible mercury in excavations. Temperature affects the volatilization of elemental mercury; therefore, a thermometer will be used to measure both the ambient air and soil temperatures when MVA measurements are being taken at each site. Collection procedures for the following types of samples to be collected during this project are described in the QAPjP, and include:

Background soil samples (described in section 4.1.4)

Site verification samples (described in section 4.2.4)

Fill material samples (described in section 4.2.6)

Field quality control samples- For every 20th site verification sample, a duplicate will be collected to evaluate the comparability of data for samples of similar material collected at sites.

Also, a field blank will be collected every 40th sample to ensure that the laboratory is not reporting mercury in material that has been verified as mercury-free.

In addition, if sample collection equipment is reused at multiple locations, equipment rinsate samples will also be collected to ensure that the decontamination procedures for that equipment are adequate and effective.

6.3 Sample Documentation and Management

To ensure that analytical data generated are admissible as evidence in potential legal actions pertaining to the project, sample collection, shipping and receiving, and laboratory analytical procedures will be thoroughly documented according to EPA protocol.

Non site-specific sampling locations, collection procedures, and other pertinent field sampling information will be entered into field logbooks. Sample containers will be labeled so that samples can be positively identified at all stages of handling and processing. Samples will be handled, shipped, and received by the laboratory in accordance with strict EPA chain-of- custody protocols.

A chain-of-custody form will be completed for each shipment of samples to the laboratory. This document will record the personnel who handle the samples and the progress of the samples from the time they are relinquished in the field to the time they are delivered in the laboratory. One copy of the form is delivered to consultant's sample management personnel when samples leave the field. The sample management team tracks the progress and processing of samples until analytical results are delivered to the client. Tasks include locating samples delayed during shipment, communicating with the laboratory regarding problems encountered during analysis, follow-up on overdue analytical results, and receiving and delivering analytical results to the client. A permanent data base is maintained that contains pertinent sample milestone dates and information taken from the chain-of-custody form. In addition, a permanent file of copies of all analytical results and chain-of-custody forms generated during the project will be maintained by KAFB in an administrative record.

6.4 Laboratory Analytical Quality Assurance and Quality Control

1. SAMPLE CHARACTERISTICS: Samples containing soil will be provided to the laboratory in quantities and frequencies described in the QA/QC plan. The soil will vary in consistency from free sand to clays. The moisture content will be less than 5%. No hydrocarbon or other organic contamination is anticipated.

2. ANALYTICAL METHODOLOGY: The laboratory will perform a chemical analysis for each sample with the objective to determine the concentration of total mercury.

The TCLP samples will be extracted in accordance with the leaching procedure promulgated in 40 CFR part 261 Appendix II as the Toxicity Characteristic Leaching Procedure (TCLP) and designated as EPA Method 1311. The TCLP leachate will be analyzed for mercury only in accordance with the Cold Vapor Atomic Absorption (Cold Vapor AA) analytical method described in the Environmental Protection Agency (EPA)

Contract Laboratory Program Statement of Work (SOW) titled:

"U.S. EPA Contract Laboratory Program Statement Work for Inorganics Analysis, Multi-Media, Multi-Concentration, SOW No. 788, Revised February 1989 and June 1989", (EPA CLP SOW No. 788).

The Total Mercury samples will be analyzed in accordance with USEPA Method 7471.

REPORTING LIMITS: The range for the chemical analysis for the TCLP procedure is from 0.002 mg/L to 2.0 mg/L. If a mercury concentration in a sample (from the TCLP leachate) is greater than 0.2 mg/L, the laboratory will report that the sample failed.

The instrument range for Total Mercury analysis will be set from 3ppm to 160ppm. If a total mercury concentration in a sample are greater than 15 ppm, the laboratory will report that the sample failed.

4.QUALITY ASSURANCE REQUIREMENTS: The quality assurance requirements of accuracy, precision and completeness as set forth under EPA methods must be followed. The labs must submit their standard operating procedures (SOP) for mercury analysis reflecting EPA Data Quality Objectives.

5.SPIKE LEVEL: The spike level for this project using EPA procedures has been set initially at 10 ug./L. The laboratory has the option to adjust the spike level according to criteria set forth within the quality assurance section of the EPA procedures based on the concentrations of mercury in the sample, to provide usable matrix spike data.

6.HOLDING TIME: The holding time requirement as set forth for EPA method 1311 and EPA methodology must be followed; that is, 28 days to TCLP extraction, and 28 days from TCLP extraction to analysis. The holding time for Total Mercury is 28 days.

7.SAMPLE PRESERVATION: Samples are to be preserved at 4 degree Celsius until the laboratory determines that the individual analysis is correct and valid. The laboratory must provide documentation that temperature requirements were complied with.

8.SAMPLE SECURITY: The security of the samples and COCs shall comply with the submitted SOP. If the samples are not under the direct supervision of an analyst they must be stored in a secured area with authorized access. If the samples are lost by the contract laboratory prior to analysis, the contract laboratory will be liable for the cost associated with having to re-sample a site.

9.LABORATORY CERTIFICATION: The work under this contract will be performed for samples taken in New Mexico. The laboratory will comply with all certification requirements of these states.

10.REPORTS: The final product will be a TCLP and/or Total Mercury deliverable Data Package which will be in the standard data format specified in the EPA Laboratory Quality Assurance documents. All analytical data will be reported on the basis of wet weight. Included with each Data Package will be the completed Chain-of-Custody (COC) form and the billing invoice.

If required to support the Data packages, copies of laboratory notebooks, data sheets and documentation may be included with the Data Package. All other data, including logbooks, data sheets, data tapes and calculations generated by the laboratory are to be retained by the laboratory for five years. At the end of five years the laboratory will contact KAFB in writing to determine final disposition.

The Data Packages are to be mailed to KAFB's designated agent. The quality of the deliverables are to meet the general guidelines stated in section 7, Validation Guidelines (as applied to mercury), of the NUS Corporation's "Analytical Laboratory Guide Book for Environmental Professionals".

11.DATA REJECTION: KAFB or its agent will review and validate all Data packages.

12.TURN-AROUND TIME: The turn-around time from the time laboratory receives the sample to the time it releases the Data Packages will be no more than ten working days.

13.SAMPLE DISPOSITION: All unused samples are to be held at the laboratory for thirty days after the complete deliverable Data Package has been delivered to KAFB or its agent. After this time period the unused samples will be disposed of in an environmentally legal manner.

14.PROJECT MANAGEMENT: The contract laboratory will designate a Project Manager who will be responsible for all aspects of the specified laboratory work and will act as the point of contact for KAFB. He or she will provide weekly oral telephone and/or written status reports to KAFB's Project Manager.

15.SAMPLE BOTTLES: The contract laboratory will include in its proposal the cost for supply 8 ounce glass ample bottles, labels, custody seals, ice chest and ice packs required for the project. This additional service needs to be clearly stated in the proposal.

7.0 DATA REQUIREMENTS AND MANAGEMENT

7.1 Data Review, Reduction, and Evaluation

Review and analysis of procedures and data are ongoing processes, and will continue throughout the life of the project. As experience is gained in the field, it is fully expected that the level of efficiency will increase. If more efficient and effective methods to fulfill project requirements are devised during the course of work, they will be incorporated into the project where appropriate. Analytical data will be reviewed as it is received from the laboratory in accordance with EPA guidelines to determine if the site is clean or if it requires additional work. Sample collection procedure documentation will also be examined to ensure that samples are being collected according to project requirements.

Data Packages:

1.Field duplicates will be checked for sampling and analytical reproducibility,

2.Field blanks will be checked to determine procedural contamination and cross contamination during shipment and storage, and

3.Reference sample will be checked to compare the analysis results to the sample's true concentration of mercury to measure and monitor overall laboratory effectiveness, and performance, and

4.The ratio of field QA/QC sample to verification samples will be checked to verify compliance of stated QA/QC field sample frequencies.

7.2 Data Presentation

Progress reports and data summaries will be generated on a regular basis. The frequency will depend upon the needs of the Air Force and on regulatory requirements. It is anticipated that reports will be submitted on a monthly basis.

7.3 Document Control and Inventory

A large volume of documentation and data will be generated during the project, and will include

Project plans

Progress and summary reports

Chain-of-custody forms and analytical data

Site-specific data

Hazardous waste shipping manifests

Memoranda, and internal communications

Regulatory correspondence

Important project documents will be duplicated and permanently filed at a secure location.These documents will be accessible only to appropriate project personnel. Documents will be organized into the above categories and will be filed in chronological order within each category. Separate files will be maintained for each location at which inspection or remedial activities occurred, and will include such items as site activity forms, log book entries, and sample and analytical data for that site. The filing system will also be designed to be compatible with existing KAFB environmental filing procedures.

8.0 PROJECT MANAGEMENT

The following sections describe briefly the responsibilities of project personnel.

8.1 Executive Project Manager

An employee of KAFB will serve as the Executive Project Manager (EPM) for this project. The EPM's responsibilities will include:

General oversight and review of all project activities and objectives

General oversight of manpower requirements

Management and tracking of the project budget

Intervention in key regulatory issues

8.2 Project Manager

An employee of the contract remediation firm will serve as the Project Manager (PM). The PM will report to the Executive Project Manager. Responsibilities will include:

Oversight and review of initial project development activities and objectives

Evaluation of alternative soil treatment methods

Oversight of task-specific manpower requirements

Oversight and scheduling field activities

Oversight of health and safety procedures

Scheduling required initial and annual health and safety training, and routine urinalyses for site workers

Monitoring medical data of field personnel and approving them for continuing field activities

Oversight of all sample management activities, and QA/QC goals and objectives

Assistance in management and tracking of the project budget

Completion of project progress and summary reports

Assistance in addressing key regulatory issues

The Contract field crew supervisor will report to the PM.

8.3 Regulatory Advisor

A KAFB employee will serve as the Regulatory Advisor (RA). The RA will also report to the Executive Project Manager.

Responsibilities include:

Communicating with concerned regulatory officials, on behalf of the Air Force, regarding all aspects of this project

Ensuring that progress reports, analytical data, and other pertinent data generated during this project are delivered to appropriate regulatory officials

Interpreting regulations, and tracking changes in the regulations that may impact project activities

Implementing changes in project activities and procedures per regulatory requirements

8.4 QA/QC OVERSIGHT OFFICER

The QAO will report to the Project Manager. Responsibilities include:

Functioning as an independent observer of QA/QC procedures utilized in the field.

Training project personnel to ensure that all aspects of the QA/QC Plan are properly implemented and project objectives are met.

Reviewing laboratory analytical data and procedures to ensure that project objectives are being met.

Investigating and implementing changes to field procedures, if changes are necessary to better achieve project objectives.

8.5 Health and Safety Officer

A contractor employee will serve as the Health and Safety Officer (HSO) for the project. The HSO will report to the Executive Project Manager and the Project Manager. Responsibilities will include

Assisting the Project Manager with implementation of Health and Safety Plan procedures

Approving any changes to the Health and Safety Plan

Assisting the Project Manager in review of medical records and improving or developing new safety procedures, when needed

Acting as council to resolve any safety issues that might arise during site operations

9.0 PROJECT SCHEDULE

Preliminary and project development work expected to be initially completed includes

Submission of the Work Plan, Health and Safety Plan, and Quality Assurance Project Plan to the appropriate regulatory personnel, finalize per their comments

Collection and analysis of background soil samples

Remedial activities are expected to begin in JULY of 1992, and will continue until approximately the end of AUGUST 1992.