FINAL WORK PLAN
FOR RAPID RESPONSE
REMOVAL OF CONTAMINATED SOILS
PESTICIDE STORAGE FACILITY
AND COYLER MANOR SITES,
FORT RILEY, KANSAS

CONTRACT NO. DACW45-94-D-0005
DELIVERY ORDER NO. 2

Submitted to:

United States Army Corps of Engineers
Omaha, Nebraska

Prepared by:

OHM Remediation Services Corp.
Midwest Region

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Project 15480

PSF_3_1_001

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1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE) has tasked OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, under the Rapid Response Contract No. DACW45-94-D-0005, Delivery Order No. 2, to perform excavation and disposal of contaminated soil at two separate sites at Fort Riley, Kansas.

This work plan (WP) is intended to detail the methods which will be employed to perform the work. This WP includes a discussion of the scope of work in Section 2.0 and OHM's technical approach in Section 3.0. Section 4.0 discusses OHM's subcontractor management plan. OHM's project team and organization are presented in Section 5.0. The Contractor's Sampling and Analysis Plan (CSAP) is included as Appendix A and the Site-specific Health-and-Safety Plan is included as Appendix B.

1.1 SITE DESCRIPTION

The project involves two sites, the pesticide storage facility (PSF) and the Colyer Manor site, at Fort Riley. Fort Riley is located in northeast Kansas about 120 miles west of Kansas City off of Interstate Highway 70. The PSF site is located in the Main Post, and Colyer Manor site is located in Camp Forsyth (see Figure 1.1).

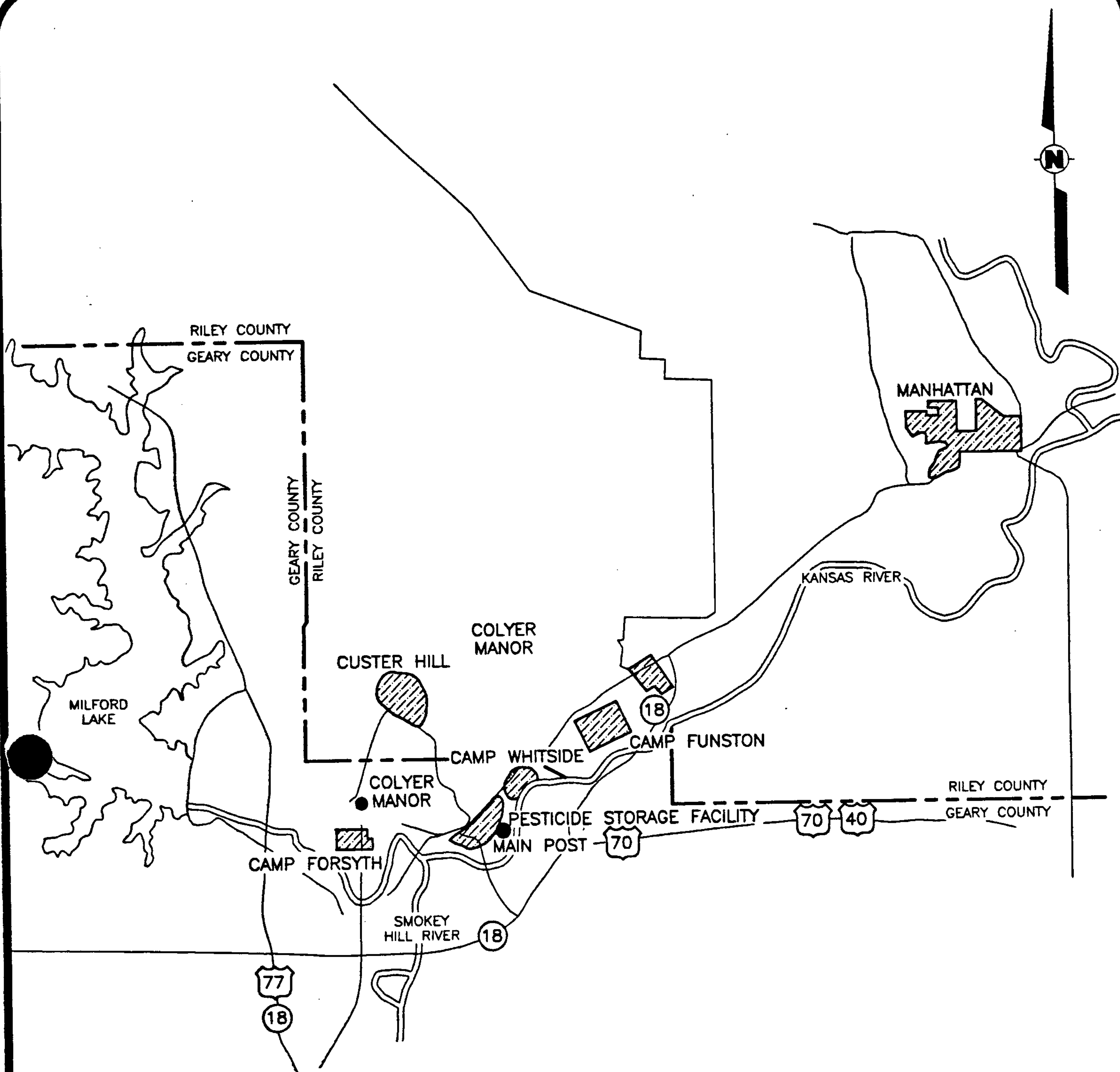
1.1.1 Colyer Manor Site

Colyer Manor is a generally flat housing area in Camp Forsyth (see Figure 1.2). Contaminated soils to be excavated are contained in an earthen berm located beyond the back yard area of Building 3135 located on Hosmer Court. The contaminant in the soils is lead. A drainage swale exists between the area to be excavated and the nearby housing units. The general area to be remediated under this delivery order is delineated in Figure 1.3.

1.1.2 Pesticide Storage Facility Site

The PSF is Building No. 348 of the main post cantonment area (refer to Figure 1.4). Contaminated soils to be excavated exist in the area around Building 348. The building, the soils beneath it, and the soils beneath asphalt or concrete pavement are not within the scope of the project. The primary contaminants are DDT, dieldrin, heptachlor, arsenic, and chlordane. The maintenance yard area of the PSF is covered with gravel up to the fence. Beyond the fence, the terrain drops off sharply into a ravine. The areas to be remediated are delineated in Figure 1.5.

Note: The expected area to be remediated at the PSF site (refer to Figure 1.5) has been preliminarily defined by OHM through composite overlay of the contamination contour maps contained in the Draft Final Engineering Evaluation/Cost Analysis (EE/CA) for the Pesticide Storage Facility, dated August 16, 1993, and prepared by the Fort Riley Directorate of Engineering and Housing, Environmental and Natural Resources Division (DEH-ENR).



General Notes:

● INDICATES GENERAL LOCATION OF COLYER MANOR AND PSF SITES.

SCALE

0 3 6 MILES

FIGURE 1.1

SITE MAP

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: APPROXIMATE	Drawing No: 15480-A1

al Notes:

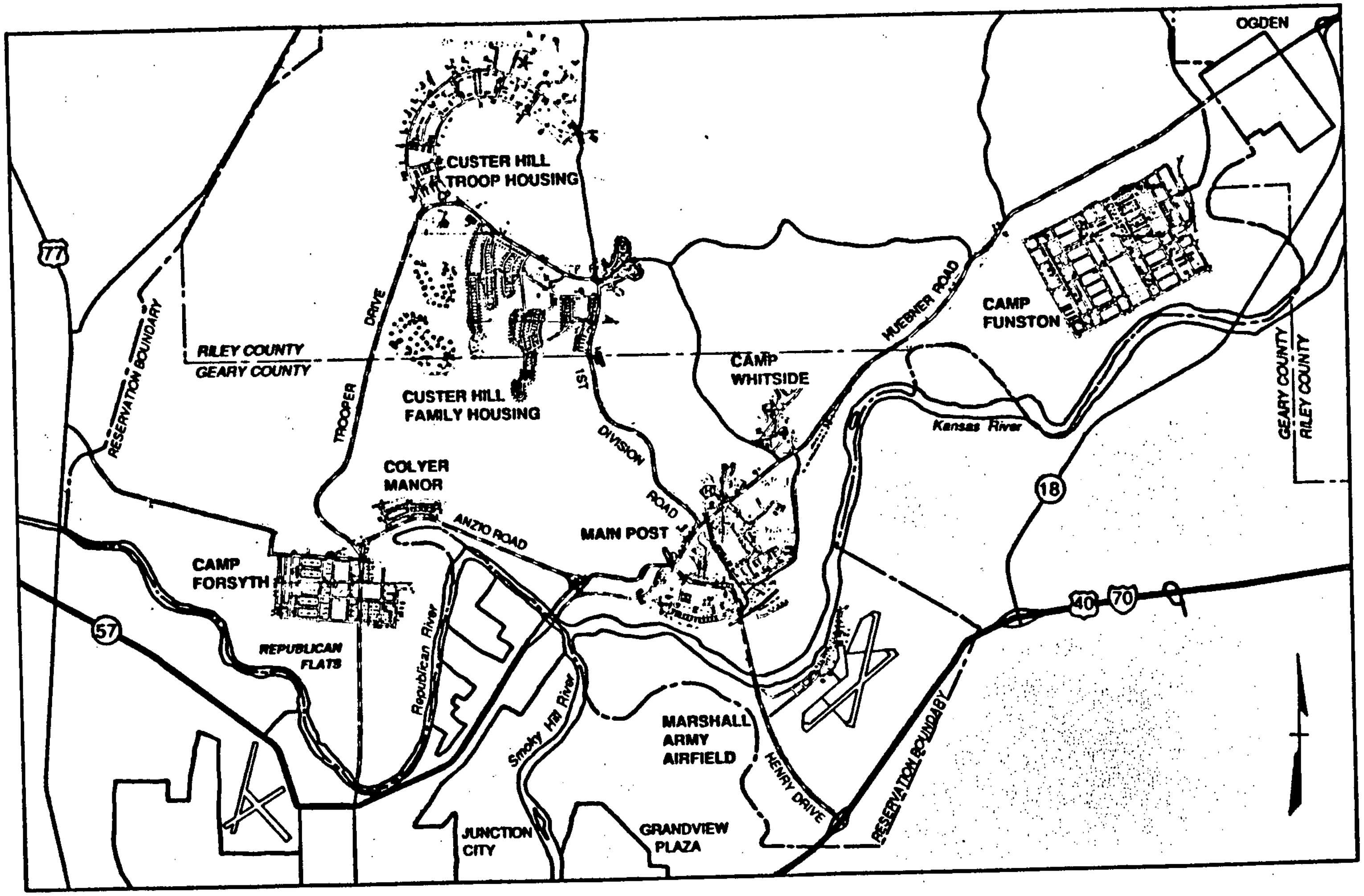


FIGURE 1.2

COLYER MANOR LOCATION MAP

FORT RILEY, KANSAS

OHM Corporation

Findlay, Ohio

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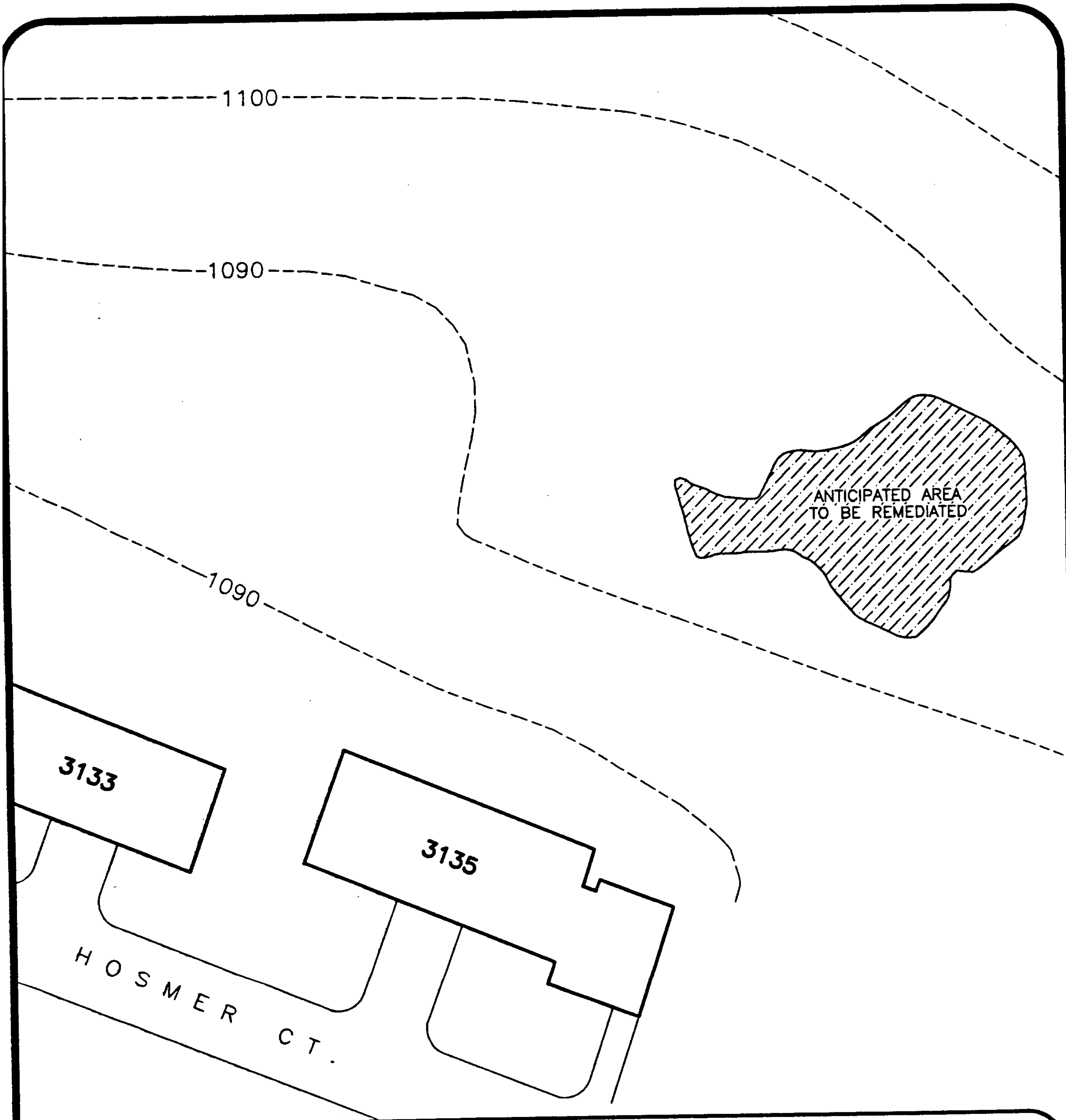

General Notes:

FIGURE 1.3

ANTICIPATED AREA TO BE
REMEDIATED AT THE
COYLER MANOR SITE

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

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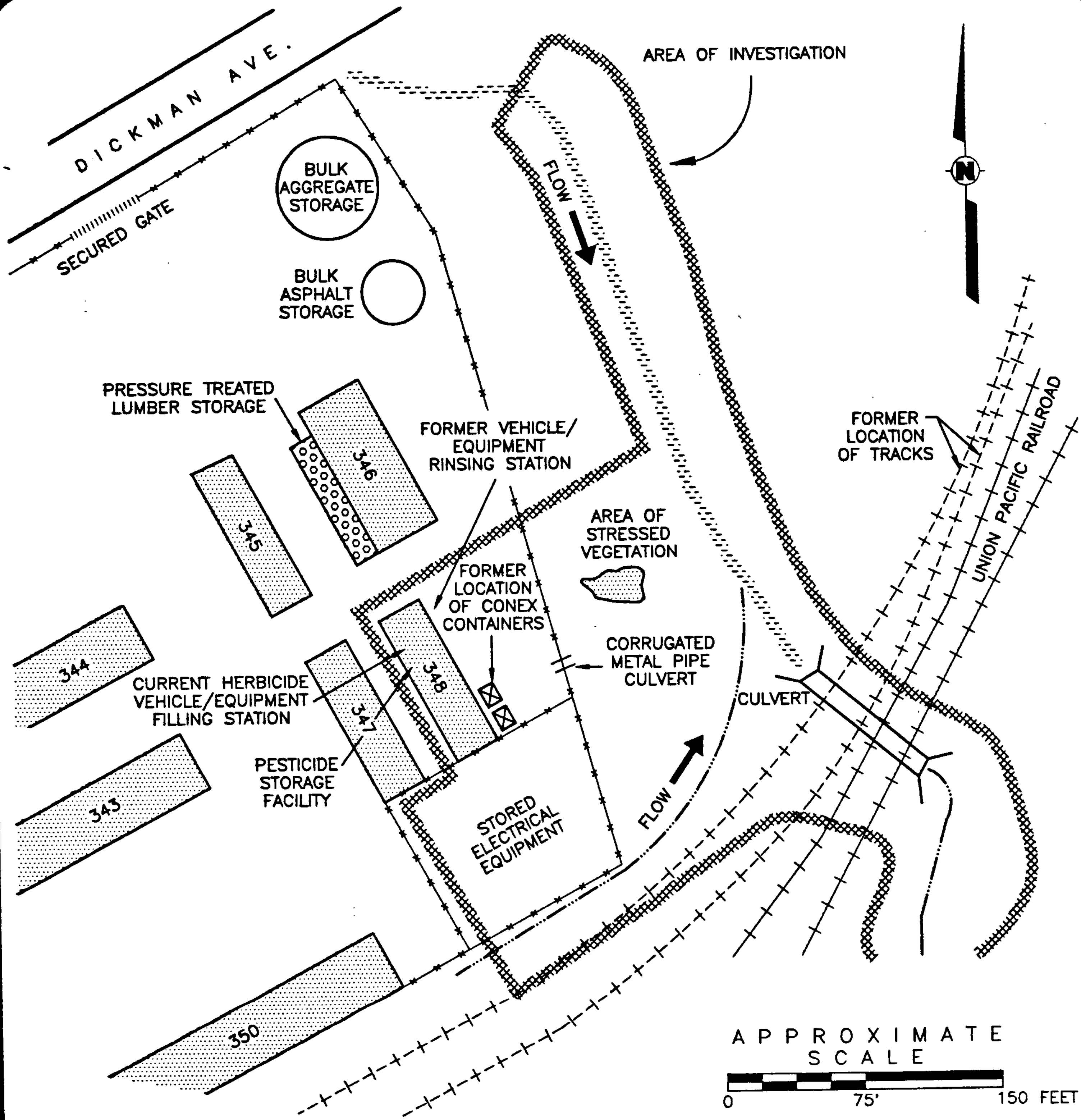

General Notes:

LIMESTONE LINED PORTION OF CHANNEL

AREA OF STUDY

FENCE

RAILROAD TRACKS

STREAM

FIGURE 1.4

PESTICIDE STORAGE FACILITY

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

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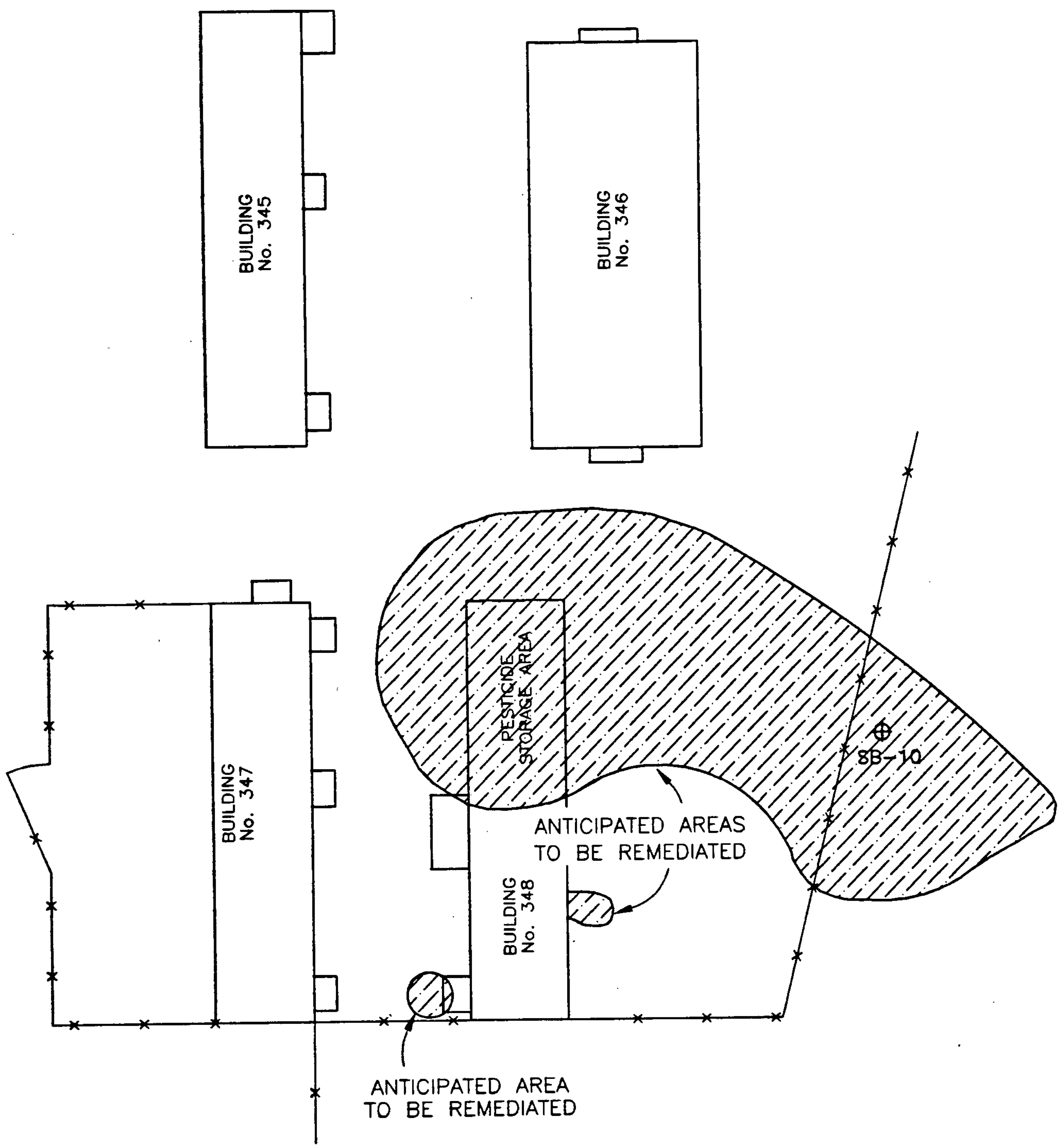


General Notes:

NO REMEDIATION WILL BE PERFORMED UNDERNEATH BUILDING OR ASPHALTIC OR CONCRETE PAVING.

SCALE
0 40 80 FEET

FIGURE 1.5
ANTICIPATED AREAS TO BE REMEDIATED FOR THE PESTICIDE STORAGE FACILITY

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale:	Drawing No: 15480-A5

1.2 SITE HISTORY

1.2.1 Colyer Manor Site

The lead-contaminated soil area of concern for this project was first identified as an area suspected of being contaminated with lead bullet fragments in 1992 during the installation wide site assessment. Refer to the Installation-Wide Site Assessment (Louis Berger & Associates, December 7, 1992, revised February 16, 1993). In 1993, the area was investigated and found to be significantly contaminated with lead. Refer to the Data Summary and Evaluation Report for Investigation of High Priority Sites Potentially Contaminated with Lead prepared by Louis Berger & Associates Inc., dated September 7, 1993, and the Removal Action Memorandum for Sensitive-Receptor Lead Site-Colyer Manor Area, dated December 1993.

1.2.2 Pesticide Storage Facility Site

The PSF was constructed in 1941, to serve as a warehouse facility and has since stored pesticides and herbicides used at the Fort. Fort Riley records do not state when pesticides were first stored in Building 348. Prior the late 1970s, the maintenance yard area east of, and adjacent to, Building 348 was used to wash down vehicles and spray equipment used for pesticide applications. Spills of pesticides and dumping of excess formulations may have also occurred.

On August 16, 1993, the draft final EE/CA was prepared by the Fort Riley DEH-ENR to develop and evaluate feasible and cost-effective removal actions. The EE/CA utilized materials developed by the Remedial Investigation Report Dated July 16, 1993, prepared by Law Environmental Government Services Division. The Installation Restoration Program Office of the DEH/ENR issued an action memorandum for a removal action of the PSF in December 1993 to document the Army's decision to take a removal action.

1.3 PROJECT OBJECTIVES

The objectives of this field effort are to excavate contaminated soils from the two sites and confirm that all contaminated soils have been removed to the action levels. The removed soils will be transported to a Resource Conservation and Recovery Act (RCRA) Subtitle C landfill for stabilization treatment and disposal. After the soils are removed, the sites will be restored in accordance with the Final Scope of Work. The project has been planned to accomplish all site work prior to April 9, 1994. Refer to the project schedule in Section 3.0.

2.0 SCOPE OF WORK

This section has been prepared based upon the scope of work delineated by the document provided to OHM by the USACE entitled:

FINAL SCOPE OF WORK
FOR
RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS
PESTICIDE STORAGE FACILITY AND COLYER
MANOR SITES, FORT RILEY, KANSAS
DACW45-94-D-0005
DELIVERY ORDER NO. 2
JANUARY 19, 1994

The scope of work (refer to Exhibit I), in general, encompasses the following tasks:

- Site visit and report
- Work plan development
- Mobilization/demobilization
- Site preparation
- Sampling and analysis
- Excavation of lead-contaminated soils at the Colyer Manor site
- Excavation of pesticide-contaminated soils at the PSF
- Transportation and disposal
- Site restoration and teardown
- Final project report

2.1 SITE VISIT AND REPORT

OHM participated in a site visit on December 1, 1993. The Site Visit Report was issued December 8, 1993. Refer to the Final Scope of Work dated January 19, 1994, for a copy of the report (refer to Exhibit I).

2.2 WORK PLAN DEVELOPMENT

The project work plan describes how the work will be performed according to the scope of work as delineated by the USACE, environmental and industrial standards, and health-and-safety requirements.

2.3 MOBILIZATION/DEMOBILIZATION

This task involves four separate subset mobilizations/demobilizations associated with:

- Precharacterization sampling
- Excavation, transportation, and disposal of wastes
- Site restoration
- Teardown

A demobilization will occur after precharacterization sampling has been completed to wait for the analytical results and to arrange for transportation and disposal of contaminated soils. A fast turnaround is planned for disposal analysis, along with 1 week for making final arrangements and conducting reviews for transportation and disposal. This timing is intended to support the objective of completing field activities prior to April 9, 1994. Refer to Section 3.0 for the project schedule.

A demobilization is planned after confirmatory sampling to wait for the analytical results. A fast turnaround time for pesticide analysis is planned to help complete field activities by April 9, 1994. Refer to Section 3.0 for the project schedule.

The third and fourth sets of mobilizations/demobilizations will be carried out to oversee site restoration by subcontractors and teardown by OHM.

Equipment, personnel, and materials to be mobilized are specified in Section 3.0 of this work plan.

2.4 SITE PREPARATION AND TEARDOWN

2.4.1 Permits

OHM will obtain the necessary permits and licenses for successful completion of the project. All transporter companies and disposal facilities will be USEPA licensed operations. Also prior to mobilization, all on-site employees will have completed Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Materials Training. Other permits required from Fort Riley are expected to include:

- Setting temporary office facilities at USACE Resident Office Area
- Connecting electrical utilities
- Obtaining sampling/excavation permits for each site

Permits required from Fort Riley will be obtained through contact and coordination with the OHM project manager or site superintendent with First Lieutenant Dan Higgins of Fort Riley DEH-ENR at 913-239-3962.

2.4.2 Exclusion Zones

Exclusion zones at both sites will be delineated based on the results of precharacterization sampling and analysis at the sites. The exclusion zones will contain the area to be excavated along with sufficient additional area for the proper movement of excavation equipment. Decontamination areas for personnel, trucks, equipment, and exit points will also be delineated.

2.4.3 Portable Decontamination Pads

A portable decontamination pad will be constructed at each site to decontaminate the tires of trucks that contact contaminated material. Each pad will be located at the exit point at each site. Figure 2.1 specifies the materials and the construction of the decontamination pads. Contaminated tires will be cleaned with a steam cleaner as the vehicle exits the site. Decontamination rinseate will be collected in a 250-gallon poly tank. At the discretion of the USACE construction representative, decontamination rinseate will be applied to contaminated soil as it is loaded into trailers as a dust control measure.

2.4.4 Temporary Storage Pads

Temporary storage pads will be constructed at each site to facilitate excavation. The pads will be located by the OHM site superintendent during site preparation. Each pad will be constructed of 30-mil HDPE with a 4-inch berm around the edges to contain rain or water applied for dust control. Any soils left overnight on a temporary pad will be protected by a visqueen covering secured by suitable means.

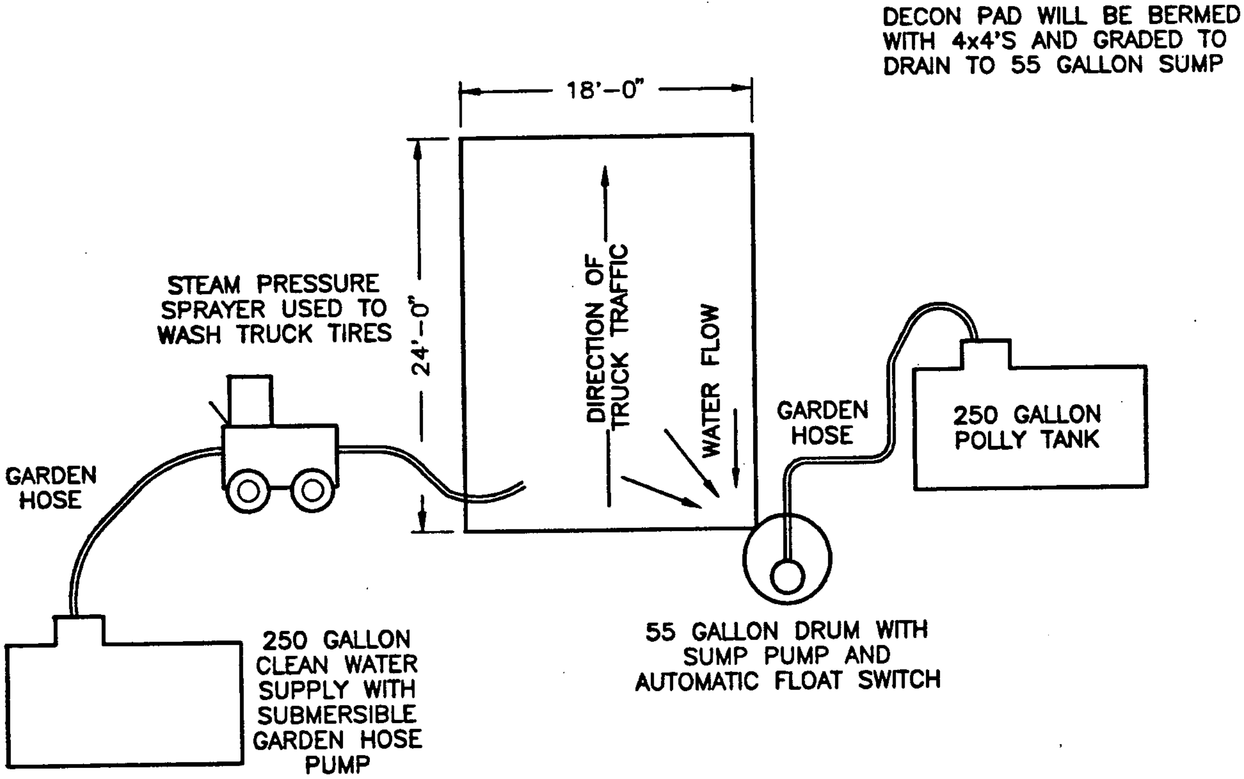
2.4.5 Fencing

Existing fencing at the PSF site will be removed and temporarily stored in the DEH yard. This existing fence will be replaced during site restoration. Temporary fencing will be erected to extend the exiting fence in two parallel runs down to, and parallel with, the culvert east of the equipment yard. Figure 2 in the Final Scope of Work depicts the removal of the permanent fence and the erection of temporary fencing. The specific location and length of the temporary fencing will be determined in the field by the OHM site superintendent during precharacterization sampling.

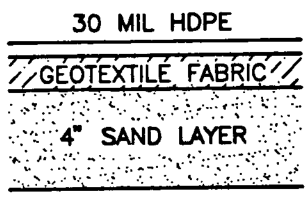
The temporary fence will be a 6-foot high chain link fence with two strands of barbed wire at the top. The fence will be supported on steel posts. Concrete foundations will not be used.

An estimated 100 linear feet of silt fencing will be installed parallel to the culvert and 3 feet inside of the temporary fence line. Six bales of hay will be placed in the area to assist with erosion protection.

At the Colyer Manor site, temporary fencing will be erected to secure decontamination facilities and store heavy equipment overnight. The dimensions of the fenced compound will be a 60-by 60-foot square. The actual location and configuration of the fenced compound will be



SCHEMATIC OF DECONTAMINATION PAD



CROSS SECTION OF DECONTAMINATION PAD

General Notes:

FIGURE 2.1
DECONTAMINATION PAD
SCHEMATIC AND CROSS SECTION
FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-27-94	Approved By:
Scale: NONE	Drawing No: 15480-A9

determined in the field by the OHM site superintendent. The fence will be a 6-foot high chain link fabric with two strands of barbed wire supported on steel posts without concrete foundations.

2.4.6 Haul Road

At Colyer Manor, rock will be laid to form a temporary haul road from the street to the exit point of the exclusion zone. The purpose of this temporary haul road is to reduce the amount of soil carried out onto fort roads. It is estimated that the haul road will be 18 feet wide and 300 feet long. The road will be constructed of an 8-inch lift of road mix gravel, with fines, compacted onto geotechnical fabric. The location and dimensions of the road will be determined by the site superintendent during precharacterization sampling.

2.4.7 Utility Connections

Three electrical utility hookups will be made to power the decontamination office trailer (located near the DEH offices), decontamination facilities, and other requirements for power at each work site. This work will be completed in coordination with DEH-ENR.

2.5 SAMPLING AND ANALYTICAL TESTING

2.5.1 Colyer Manor Site

Lead contaminated soils at the site will be precharacterized for disposal. The precharacterized sampling phase will also accomplish definition of the initial limits of excavation. Confirmation sampling will be carried out to confirm that all soils above 5 feet below the ground surface containing lead concentration above the action level have been removed. Sampling and analytical activities for the Colyer Manor site are defined in the CSAP in Appendix A.

2.5.2 Pesticide Storage Facility

At the PSF site, soils contaminated with pesticides and arsenic will be precharacterized for off-site stabilization and disposal. The precharacterization phase will also include definition of the initial limits of excavations. Background sampling and analysis for arsenic, beryllium, thallium, and nitrates will also be accomplished in the precharacterization phase. Confirmation sampling and analysis will confirm that soils at or above 5 feet below the existing ground level that are contaminated with arsenic and pesticides above the action levels have been removed. The sampling analytical tasks at the PSF site are defined in the CSAP in Appendix A.

2.5.3 Backfill and Source Water

It is planned that backfill material and source water will be certified as being noncontaminated and that sampling and analysis for pesticides, semivolatile organics, volatile organics, and metals will not be necessary.

2.6 EXCAVATION OF LEAD-CONTAMINATED SOILS AT THE COLYER MANOR SITE

Prior to excavation, OHM will determine the initial excavation limits. The excavation will be accomplished using a Caterpillar 215 backhoe or an equal. All soils above 5 feet below ground surface containing lead concentration above the action level will be excavated. The excavated material will be directly loaded into dump trailers. A temporary storage pad will be utilized to facilitate excavation and load out activities. Any soils left stockpiled overnight will be protected with a visqueen cover secured by suitable means. The loaded dump trailers will be tarped. The truck tires will be decontaminated, and the trucks will be weighed on a portable scale at the site for manifest completion.

On-site manifest documentation and oversight will be performed in accordance with OHM's USACE Transportation and Disposal Procedures Manual, dated December 1993.

After initial excavation, OHM will sample the excavated area and analyze the samples for lead. The CSAP in Appendix A specifies the confirmation sampling and analysis to be performed.

Based on the confirmation samples, OHM may perform additional excavation and confirmatory sampling and analysis until analytical results indicate soils containing contamination above the prescribed action level of 500 milligrams per kilograms (mg/kg) have been removed.

2.7 EXCAVATION OF PESTICIDE-CONTAMINATED SOILS AT THE PESTICIDE STORAGE FACILITY

The initial excavation limits will be determined based on results from the precharacterization sampling and analysis tasks. OHM will perform the excavation using a Caterpillar 215 backhoe or equal. Soil excavation will be to a maximum of 5 feet below the existing ground surface. Soils under existing asphalt or concrete pavements and under Building 348 will not be excavated. Care will be taken to excavate the contaminated material surrounding the foundation of Building 348. The vertical foundation wall will be exposed down to the top of the footer, and a 1:1 slope cut of soil will be left below that to prevent undercutting of the foundation. An underground natural gas line within the site will require delineation by Fort Riley personnel prior to excavation activities. Hand excavation will be necessary within 2 feet of the gas line. The monitoring well(s) within the excavation area will be saved. Following the initial excavation, OHM will sample the excavated area. The sampling and analytical methodologies for confirmatory sampling are contained in the CSAP in Appendix A.

Based on the confirmation samples, OHM may perform additional excavation and confirmatory sampling and analysis until analytical results indicate all soils above the 5 foot level that contain contamination above the prescribed action levels have been removed.

Excavated material will be directly loaded into dump trailers. A day pile will be utilized to facilitate excavation and loading. Any soils left stockpiled overnight will be protected with a visqueen cover secured by suitable means. The loaded dump trailers will be tarped. The truck tires will be decontaminated. The trucks will be weighed using a portable truck scale.

On-site manifest documentation and oversight will be performed in accordance with OHM's USACE Transportation and Disposal Procedures Manual, dated December 1993.

2.8 SITE RESTORATION

2.8.1 Colyer Manor Site

At the conclusion of the excavation activities at each site, all equipment used on the site will be decontaminated before demobilization. Portable decontamination pads will again be used. Gross contamination will be scraped from the machines prior to being washed with a steam cleaner. The decontamination rinsewater will be collected and applied to the last loads of contaminated soil as a dust control measure. Any remaining decontamination rinsewater will be transported and treated off site. The temporary storage pad and decontamination pad materials will be loaded as waste into the last trailer on the site.

The temporary security fencing will be dismantled and removed from the site. The secure storage area will be restored to the original grade. The temporary haul road materials will be used as the initial backfill of the excavation. A minimum of 1 foot of backfill will cover the entire excavated area. Suitable soil material as defined in paragraph 1.1 and 1.2 of Appendix J of the Final Scope of Work will be used. Cohesionless backfill will e used within 1 foot of any utility. The backfill will be placed in a loose lift with a thickness of no more than 12 inches and composited to at least 85 percent of maximum density. A minimum of 6 inches of top soil will be placed on top of the area. The area will be reseeded, and turf will be reestablished in the reseeded area. The existing drainage swale will be restored to its original grade. Appendix J of the Final Scope of Work sets forth the requirements for site restoration.

2.8.2 Pesticide Storage Facility

At the completion of the excavation activity, final decontamination of equipment will be accomplished, and the temporary storage pad, decontamination pad, and materials will be demobilized and loaded into the last waste trailer on the site. Remaining decontaminated water will be pumped into the last waste trailer on site or transported separately and treated off site at the direction of the USACE construction representative.

The excavated areas within the Building 348 storage yard will receive gravel pavement. Paragraphs 1.2, 1.3, and 1.6 through 1.93 of Appendix J of the Final Scope of Work will be followed for this activity. Cohesionless backfill will be used within 1 foot of the gas line and any utilities.

Excavated areas outside the Building 348 storage yard will receive top soil, and turf will be re-established by reseeding bare areas. Excavated areas will be backfilled in loose lift thicknesses of no more than 12 inches and compacted to at least 85 percent of maximum density.

The areas will be restored to their original grades. Paragraphs 1.1, 1.2, 1.4, 1.6, 1.7, 1.9, and 2 and 3 will be followed to accomplish the restoration of the areas.

The silt fence and hay bales will be removed. The temporary fence will be removed, and the permanent fence will be reinstalled.

2.9 FINAL PROJECT REPORT

Within 3 weeks of completing the on-site work for the delivery order, OHM will submit a final project report. The final project report will include a summary of the work performed including, but not limited to:

- Scope of work narrative
- Safety
- Quality control
- Recommendations, lessons learned
- Conclusions
- Any other unique or special tasks performed or situations documented

The tabulation of criteria, data, calculations, etc., which were performed but not included in detail in the report will be assembled as appendices. The appendices will include, but are not limited to:

- Final scope of work
- Completed permits and verbal conversation records concerning any permitting
- Hazardous-waste manifests, waste profile sheets, shipping documents, land disposal restriction certifications, and notifications
- Rapid response daily work orders
- Rapid response quality control daily reports
- Sampling and analysis documentation and results
- Chain-of-custody records
- Photo documentation
- List of visitors
- Project points of contact address and phone
- Survey reports and backup notes

- Completed verbal conversation records, especially ones that impact the scope of work, cost proposal, or final report
- Finalized versions of the transportation and disposal and the analytical results summary table
- Weekly reports

3.0 TECHNICAL APPROACH

This section discusses the operational methods, types of personnel, and equipment which will be utilized to complete the scope of work.

3.1 SCHEDULE MONITORING AND CONTROL

The work tasks will be performed according to the schedule developed for the project (see Figure 3.1). Any major modifications to the work plan will be submitted to the USACE for review prior to the actual implementation of the modification.

The schedule will be monitored and controlled in conjunction with the tracking of costs through the use of computerized cost/resource tracking and project management techniques developed by OHM.

3.1.1 Submittals

Submittals include this final project work plan submitted as per the USACE Final Scope of Work dated January 19, 1994; daily submittals; weekly status reports; hazardous-waste manifest biennial reports; hazardous-waste manifests; and a final report.

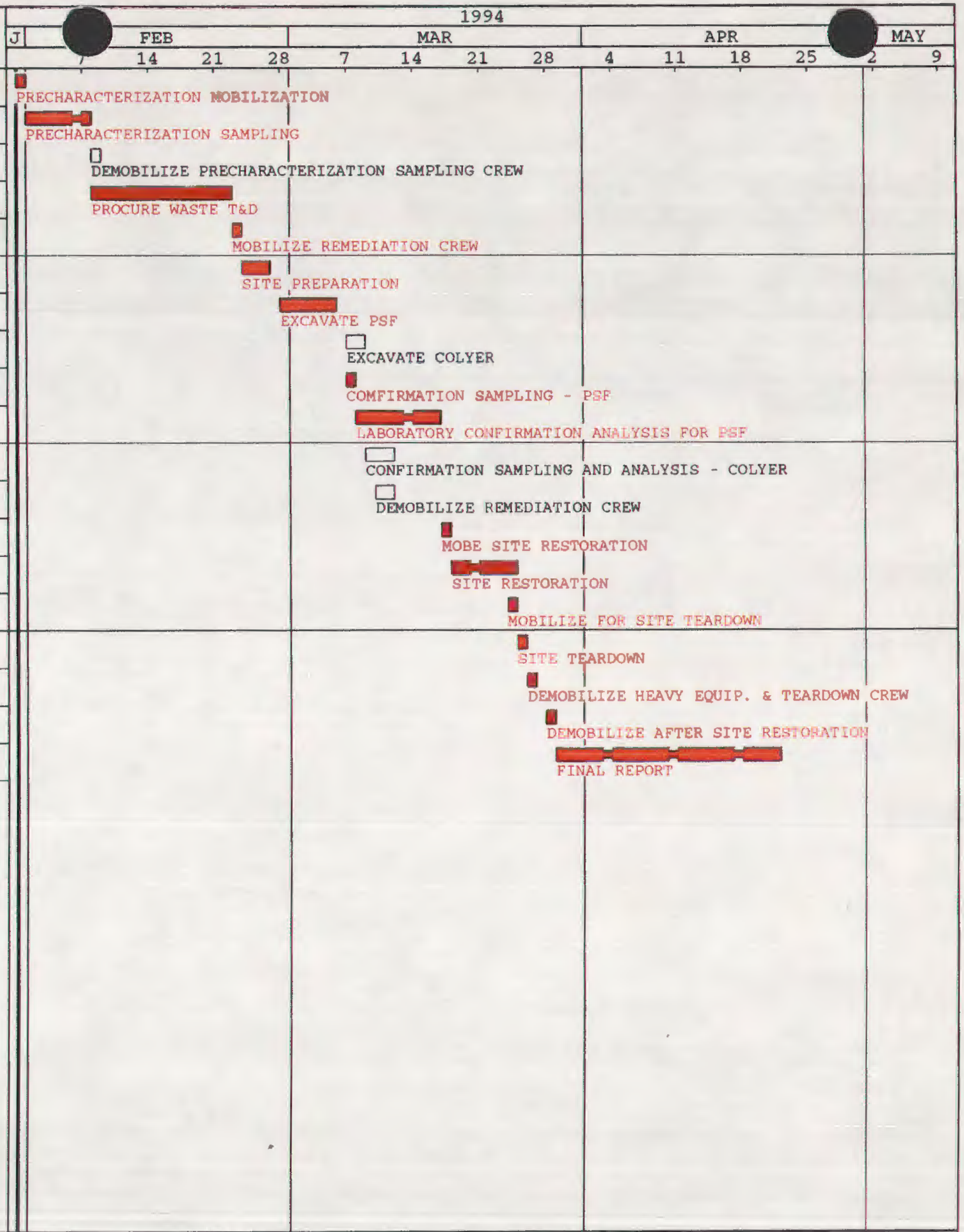
Weekly status reports will be prepared in accordance with the requirements of the Final Scope of Work and submitted by 0700 Central Standard Time on each Monday to the locations specified in Table 1 of the Final Scope of Work.

OHM will submit to the USACE estimates of the amounts and types of wastes generated at the locations for disposal in the weekly status reports and annual and biennial hazardous-waste manifest reports. OHM will obtain currently required reporting forms related to the shipment and disposal of hazardous waste as per the Final Scope of Work.

OHM will prepare hazardous-waste profiles and manifests for the USACE review, approval, and signature prior to the scheduled shipment of any hazardous wastes. OHM will also submit relevant shipping papers for nonhazardous wastes which may require transportation and disposal from this project site. OHM's Midwest Region Transportation and Disposal Department will prepare hazardous-waste manifests and nonhazardous waste shipping papers. OHM's transportation and disposal coordinator will review all waste profiles, land disposal restriction notifications, certifications, and waste manifests prior to their submittal to the USACE.

OHM's transportation and disposal coordinator will submit all relevant supporting documentation such as analytical reports and material safety data sheets with the above-mentioned documents, accompanied with a cover letter which describes the logic by which specific waste disposal

ACTIVITY DESCRIPTION	ORIG DUR	EARLY START	EARLY FINISH
PRECHARACTERIZATION MOBILIZATION	1	31JAN94	31JAN94
PRECHARACTERIZATION SAMPLING	6	1FEB94	7FEB94
DEMOBILIZE PRECHARACTERIZATION SAMPLING CREW	1	8FEB94	8FEB94
PROCURE WASTE T&D	15	8FEB94	22FEB94
MOBILIZE REMEDIATION CREW	1	23FEB94	23FEB94
SITE PREPARATION	3	24FEB94	26FEB94
EXCAVATE PSF	6	28FEB94	5MAR94
EXCAVATE COLYER	2	7MAR94	8MAR94
COMFIRMATION SAMPLING - PSF	1	7MAR94	7MAR94
LABORATORY CONFIRMATION ANALYSIS FOR PSF	8	8MAR94	16MAR94
CONFIRMATION SAMPLING AND ANALYSIS - COLYER	3	9MAR94	11MAR94
DEMOBILIZE REMEDIATION CREW	2	10MAR94	11MAR94
MOBE SITE RESTORATION	1	17MAR94	17MAR94
SITE RESTORATION	6	18MAR94	24MAR94
MOBILIZE FOR SITE TEARDOWN	1	24MAR94	24MAR94
SITE TEARDOWN	1	25MAR94	25MAR94
DEMOBILIZE HEAVY EQUIP. & TEARDOWN CREW	1	26MAR94	26MAR94
DEMOBILIZE AFTER SITE RESTORATION	1	28MAR94	28MAR94
FINAL REPORT	21	29MAR94	21APR94



Plot Date 28JAN94
Data Date 31JAN94
Project Start 31JAN94
Project Finish 21APR94

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

USACE, Fort Riley, Kansas
Lead and Pesticide Excavation

Sheet 1 of 1

USACE, Fort Riley Excavation Project

Date	Revision	Checked	Approved

FIGURE 3.1

PROJECT SCHEDULE

alternatives are suggested by OHM to the USACE. OHM will not ship any wastes without prior approval and signature of waste manifests by the generator.

The preparation of the final report is discussed in Section 2.9 of this work plan.

3.2 PRECONSTRUCTION ACTIVITIES

Preconstruction activities for this project include the following:

- Attending a preconstruction meeting with the USACE
- Issuing subcontracts as required to support construction
- Communicating with Fort Riley to locate utilities at the job site
- Obtaining permits as needed
- Coordinating with Fort Riley to install temporary construction facilities
- Coordinating with Fort Riley to provide oversight and repair compatibilities for gas line excavation
- Preparing a community relations plan for activities in the work plan by Fort Riley

3.3 CONSTRUCTION ACTIVITIES

3.3.1 General

The primary construction activities for this project include the following:

- Mobilization of personnel and equipment
- Site preparation including: the set up of the site office, support zones, decontamination stations, and exclusion zones; the dismantling of permanent fencing at PSF; the erection of temporary fencing at both sites; and the installation of the haul road at Colyer Manor.
- Excavation of contaminated soil at the Colyer Manor and PSF sites
- Analytical determinations of removal criteria fulfillment at both sites
- Backfill and compaction of the excavated area

- Site restoration and teardown

3.3.2 Field Resources

Resources will be applied to accomplish the project according to the work plan and schedule. Refer to Figure 3.2 for a graphic representation of how field resources will be applied.

3.3.3 Contaminated Soil Removal

OHM has identified two distinct wastestreams from this project, the lead contaminated soils from Colyer Manor and the pesticide and arsenic contaminated soils at the PSF. OHM understands that the arsenic contamination near SB-10 (EE/CA, Figure 4.1) is related through process of generation to the PSF and, operationally, cannot be separated physically.

3.4 WASTE TRANSPORTATION AND DISPOSAL

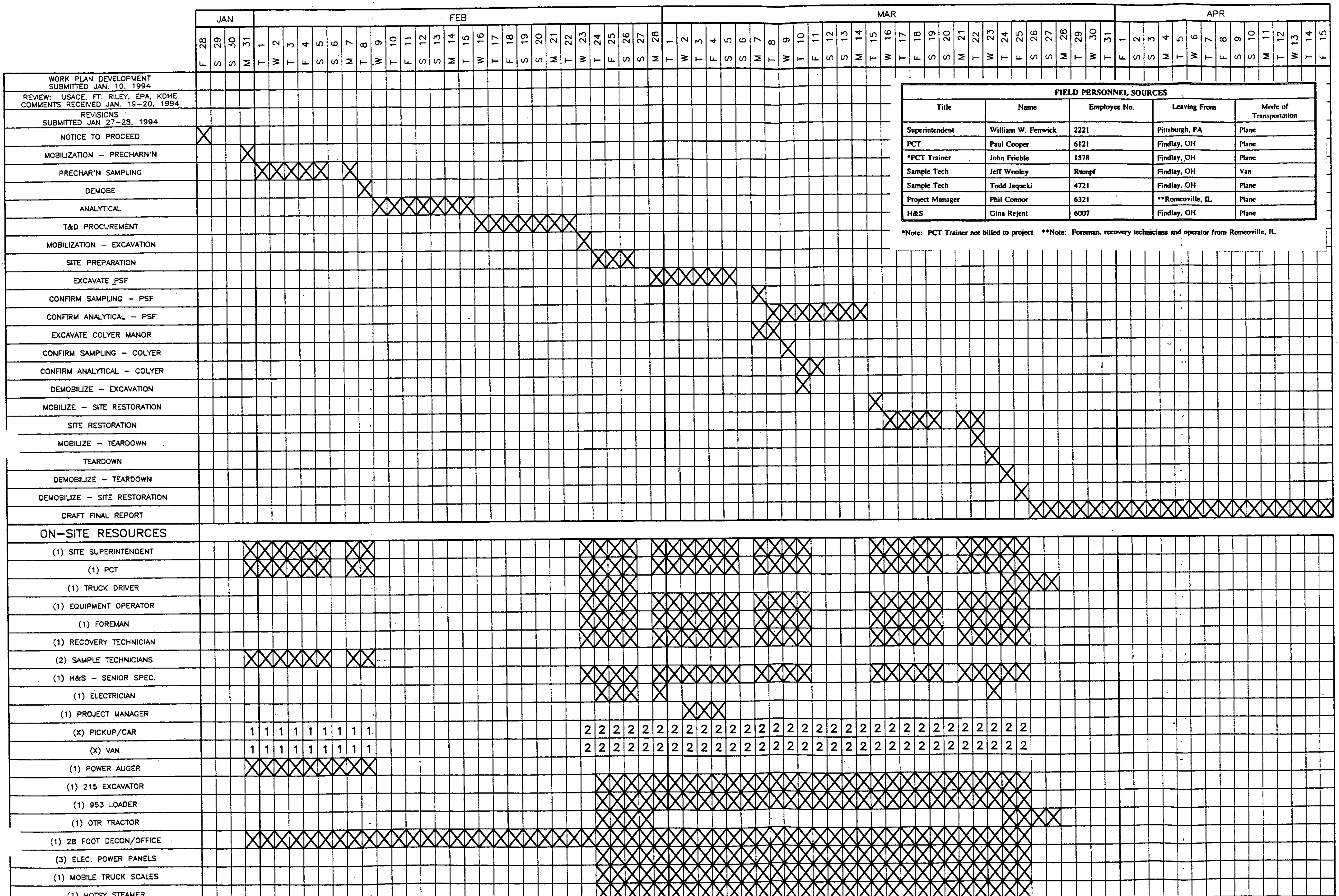
The waste from the two sites will be transported to a RCRA Subtitle C landfill. OHM will utilize licensed haulers and disposal firms.

The disposal and transportation vendors chosen by OHM for the USACE projects directly impact the productivity and future liability of a project. The procurement of licensed, cost effective, and productive vendors by the requirements set forth in the contract is the most important portion of the transportation and disposal operations.

3.4.1 Colyer Manor Waste On Site

Lead bullets and their fragments are the source of the contamination. The affected soils will be sampled and characterized prior to mobilization in order to direct load into dump trailers for transport.

The waste code for the material from Colyer Manor will be D008 (lead) assuming the toxicity characteristic leaching procedure (TCLP) lead concentrations from representative samples exceed 5.0 parts per million (ppm). The cleanup criteria has been established as 500 mg/kg total lead for the affected area. Table 3.1, represents the cleanup criteria for Colyer Manor. The cleanup objectives of the project were revised on January 3, 1994, in the letter to Phillip Connor, OHM Project Manager, from Robert F. Smart, P.E., Assistant Chief, Environmental Branch USACE (refer to Exhibit II).



FIELD PERSONNEL SOURCES				
Title	Name	Employee No.	Leaving From	Mode of Transportation
Superintendent	William W. Fenwick	2221	Pittsburgh, PA	Plane
PCT	Paul Cooper	6121	Findlay, OH	Plane
*PCT Trainer	John Frieble	1578	Findlay, OH	Plane
Sample Tech	Jeff Wooley	Rumpf	Findlay, OH	Van
Sample Tech	Todd Jaqueki	4721	Findlay, OH	Plane
Project Manager	Phil Connor	6321	**Romeoville, IL	Plane
H&S	Gina Rejent	6007	Findlay, OH	Plane

*Note: PCT Trainer not billed to project **Note: Foreman, recovery technicians and operator from Romeoville, IL

General Notes:

No.	Revision/Issue	Date

FIGURE 3.2

FIELD RESOURCE UTILIZATION SCHEDULE

RAPID REMOVAL OF CONTAMINATED SOILS FORT RILEY, KANSAS

PREPARED FOR

U.S.A.C.E.
DACW45-94-D-005
DELIVERY ORDER No. 2

OHM Corporation
Findlay, Ohio

Drawn By: L. DUHGG	Checked By:
Date: 1-27-94	Approved By:
Scale: NONE	Drawing No: 15480-B1

TABLE 3.1 COLYER MANOR CLEAN-UP CRITERIA	
Chemical Name	Cleanup Level
Lead	500 mg/kg

3.4.2 Pesticide Storage Facility Waste On Site

Approximately 840 cubic yards of soil will be removed as part of the remedial action at the PSF. OHM will remove all soils which contain pesticide and arsenic concentrations above the action levels specified. The soils excavated will be loaded directly into 22-cubic yard dump trailers for transport. Table 3.2, PSF Cleanup Criteria, presents the cleanup objectives as revised on January 3, 1994, in the letter to Phillip Connor, OHM Project Manager, from Robert F. Smart, P.E., Assistant Chief, Environmental Branch, USACE (refer to Exhibit II).

TABLE 3.2

PSF CLEANUP CRITERIA

Chemical Name	D-Code	Listed Code	TCLP Limit (in milligrams per liter (mg/l)	LDR Limit* (in mg/kg)	Cleanup Level* (in mg/kg)
DDT	N/A	U061	N/A	0.087	0.66
Dieldrin	N/A	P037	N/A	0.13	0.014
Heptachlor	D031	P059	0.008	0.066	0.050
Chlordane	D020	U036	0.03	0.13	0.17
Arsenic	D004	N/A	5.0	N/A	Background

*Concentrations are total, not leachable levels
N/A = Not applicable

Fort Riley will provide OHM a letter defining the process of generation further clarifying the waste as characteristically hazardous.

3.4.3 Procurement of Transportation and Disposal Vendor

Plan

OHM will utilize sound decision logic to assign waste codes that are documented. We will utilize contacts with the regional USEPA offices and evaluate past relations with the vendors, disposal requirements of the wastestream, and cost. We will also examine vendors' past experience, compliance with license and permit requirements, truck availability, the location of the transportation and disposal facility (TSDF) in relation to the site, and cost.

Goals

OHM has the following goals for selecting a vendor for transportation and disposal services:

- To ensure all vendors chosen for the USACE projects comply with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) disposal policies set forth in 40 CFR 300.440
- To ensure the procurement of the vendors is done in accordance with the Federal Acquisition Requirements (FAR)
- To ensure the most cost effective, environmentally sound, and productive method for transportation and disposal of waste on the USACE projects is utilized

Procedures

Determination of Waste Codes

The 40 CFR, Part 261 "Identification and Listing of Hazardous Waste" is the basis for determination of waste codes. The basic steps taken in determining waste codes are as follows:

Step 1: Does the waste contain any discarded commercial chemical products, off-specification species, container residues, or spill residues, thereof (40 CFR 261.33)? If the answer is yes and the material is listed in one of the two tables in Part 261.33, then the material must be a listed U or P waste.

Step 2: Is the waste the result of a specific source and is the process listed in 261.32? If so, the material must be listed as a K waste.

Step 3: Is the waste the result from a non-specific source and is the source listed in 261.31? If so, the material is listed as an F waste.

Step 4: Does the material exhibit the characteristics of hazardous per the criteria set forth in 40 CFR 261 Subpart C? If so, the analytical results must be compared to the maximum allowable concentrations and criteria and the corresponding D code assigned.

Step 5: Is the waste hazardous by state guidelines, is the material considered an nonhazardous special waste, or can the material be considered sanitary waste? State regulations will determine the regulations considered for this step. The generator of the waste may choose to certify no process or specific source and render the waste nonhazardous as long as there are no characteristics.

Selection of Disposal Technology

The disposal technology utilized for the predetermined waste codes will depend upon the following aspects:

- Possibility of on-site treatment technologies that would decrease disposal cost and liability
- The land disposal restrictions on listed waste (40 CFR 268)
- The USACE preferred technologies
- The best interest of the USACE's client in regard to future liability

Selection of Disposal Facility

Choosing the appropriate disposal facility will be based upon the following criteria:

- **Facility status**. The regulations in 40 CFR 300.440 require contacting the regional USEPA office for approval of disposal facilities prior to receiving CERCLA waste. Figure 3.3 (CERCLA Off-Site Response Approval Memo) gives the contacts and documentation that must accompany each profile submitted to USACE to show the vendor is CERCLA approved.

FIGURE 3.3

CERCLA OFF-SITE RESPONSE APPROVAL MEMO

Date: ______________ Contractor.D.O. No.: ______________

Project: ______________ USACE Site Rep: ______________

Waste Stream: ______________

TSDF Name/Location: ______________

EPA Contacts: (Circle person contacted)

REGION	PRIMARY CONTACT	SECONDARY CONTACT
I, Boston (CT, MA, ME, NH, RI, VT)	Lynn Hanifan 617/573-9662	Austine Frawley 617/573-1754
II, New York (NJ, NY, PR, VI)	Greg Zaccardi 212/264-9504	Joel Golumbek 212/264-2638
III, Philadelphia (DE, MD, PA, VA, WV, DC)	Sarah Casper 215/597-1857	Naomi Henry 215/597-8338
IV, Atlanta (AL, FL, GA, KY, MS, NC, SC, TN)	Edmund Burks 404/347-7603	John Dickinson 404/347-7603
V, Chicago (IL, IN, MI, OH, WI)	Gertrud Matuschkovitz 312/353-7921	Uylaine McMahon 312/886-4445
VI, Dallas (AR, LA, NM, OK, TX)	Ron Shannon 214/655-2282	Joe Dougherty 214/655-2281
VII, Kansas City, KS (IA, KS, MO, NE)	Gerald McKinney 913/551-7816	David Doyle 913/551-7667
VIII, Denver (CO, MT, ND, SD, UT, WY)	Terry Brown 303/293-1823	George Dancik 303/293-1506
IX, San Francisco (AZ, CA, HI, NV, AM SOM, GUAM, PAC TR TERR)	Diane Bodine 415/744-2130	Gloria Brownley 415/744-2114
X, Seattle (AK, ID, OR, WA)	Ron Lilich 206/553-6646	Kevin Schanilec 206/553-1061

COMMENTS

Submitted by: ______________

Printed Name: ______________

- **Permit delays**. Many states and facilities require lengthy approval processes that could negatively impact the project schedule. Ensuring the approval time frame works within the scope of the project is the responsibility of the regional transportation and disposal coordinator.

- **Cost, availability, and scheduling constraints**. The most cost effective option must also be able to handle the capacity expected from the project. If this is not possible, then the second and possibly the third highest bidders must be contracted to handle the overflow of material from the least expensive facility.

- **Facility ability**. Many TSDFs have constraints on the size or type of material they can process efficiently. If OHM anticipates large rocks or other debris may be present in the load, the facility that can process the material will be utilized.

Selection of Transporters

OHM decision logic for procurement of transporters for a particular site is based upon the following parameters:

- **Truck depot**. Transporters with terminals near the site will minimize the charges incurred for time involved in returning the driver and vehicle back to the terminal. The vendors with trucking dispatch offices close by increases the possibility of a quick response with vehicles when needed.

- **TSDF relationship**. Equally favorable is a transporter with a terminal near the TSDF. This will increase the response time to the site but not negatively affect transport cost.

- **Transportation vehicles**. The method of shipment must be determined by the USACE and OHM in the site-specific transportation and disposal management plan prior to the commencement of work. Most transportation firms specialize in a certain type of transportation vehicle (i.e., van trailers, tanker trucks, roll-offs, dumptrucks, etc.). Utilizing a firm that maintains a fleet of the type of vehicles needed for the project will minimize the possibilities of schedule constraints.

- **Vendor experience**. The task of scheduling materials into the site and then into the facility must be done with precision timing to minimize demurrage charges. Transportation firms that routinely miss their scheduled arrival times or arrive on sites with messy, poorly maintained vehicles will affect the project. This type of history is rarely documented and filed in a formal manner, but a negative experience that caused OHM additional cost or negatively impacted OHM's reputation with the client will not soon be forgotten. Transporters who continually provide inadequate service will not be given further bidding opportunities, regardless of cost, until the issues are resolved.

- **Licenses**. Most states require the transporter to be licensed in the state to transport hazardous waste. The transporter is responsible for accurately informing OHM in which states they are, and are not, permitted to transport. To determine if the transporter can be considered for a particular project, the OHM regional or on-site coordinator must designate the state of generation and the location of the TSDF and the route which is most effective between the two points.

- **Cost comparisons**. OHM will obtain three competitive bids from transporters that meet the above-mentioned criteria. The bids will be obtained for transport from the site of generation to the three applicable disposal facilities. The bids from the transporters must be written and meet the following criteria:

  - All cost that may be incurred (i.e., demurrage, liners, truck cleaning, etc.)

  - The name and location of the nearest terminal and billing office, the point-of-contact, and the USEPA and applicable state identification numbers

  - The minimum charge per load that will be incurred

  - Any special licensing or insurance requirements required by the project

3.4.4 Packaging, Handling, and Characterization of Waste

Soil will be sampled according to the statistically valid sampling scheme presented in the CSAP in Appendix A. These events will be coordinated with the on-site transportation and disposal coordinator. One composite sample of the soils that are defined from each area will be submitted for landfill disposal parameter analysis. The results will be reviewed by the OHM regional hazardous-waste manager. A split sample for treatability study will be sent to the selected TSDF. The landfill disposal parameter results of the composite analysis will be used for profiling the waste.

The waste will be packaged, handled, and manifested as RQ Hazardous Waste Solid, n.o.s., (contains primary constituents). 9, NA3077 PG III. The excavated soils will be loaded directly into lined-end dump trailers.

The trucks will be scheduled for transport upon acceptance of the profiled waste by the disposal facility. This is intended to be coordinated to coincide with mobilization activities. Presently, Fort Transfer, Morton, Illinois, has quoted the best cost for loading up to 15 trucks per day.

The USACE-approved manifests will be prepared by the hazardous-waste manager and sent to the site during mobilization activities.

In the 49 CFR 172.201 (a)(4)(b), the DOT states that "a shipping paper must contain an emergency response telephone number, as prescribed in Subpart G of Part 172 of this subchapter" when hazardous waste/materials are being transported. We intend to use a generator-supplied 24-hour emergency response phone number. If the USACE does not supply the number at the pre-construction conference, OHM will utilize a contractor that will supply the 24-hour emergency services.

3.4.5 Selected Treatment Storage and Disposal Facility

The determination of the waste codes for the solids to be removed from the PSF is critical to select the appropriate TSDF. The scenario presented here is based on the waste as exhibiting the toxicity characteristic. This entails stabilization at the TSDF prior to landfilling the waste.

Pricing for stabilization/landfill of the waste(s) from each site includes the option of combining the volumes from the both the PSF and Colyer Manor sites because the disposal technology involved is identical for both wastestreams. This option is dependent upon the declaration of the waste from the PSF to be characteristically hazardous. Should this be the case, the selected TSDF would be:

Highway 36 Landfill
108555 East Highway 36
Deer Trail, CO 80105-9611
Krystal Horst
800-392-1036
303-773-2205 (fax)

The TSDF requires a 1-gallon sample from each area with a signed profile and analytical results sent to the above address. TSDF indicates approximately 2 weeks for completion of their treatability study, definitive pricing, and approval upon receipt of the sample and signed profile.

3.4.6 Document Submittal Procedures

Scope

The contract between OHM and the USACE contains procedural requirements for certain aspects of project work. One procedure is the review and approval of the documentation prior to its use. When OHM completes a profile or manifest for the USACE, OHM defines waste and procedures to a third party, namely a TSDF, transporter, or regulatory agency. To ensure OHM is properly representing the USACE's point of view on these documents, procedures and protocols have been developed by the USACE regarding the review of paperwork prior to submittal by OHM.

Goal

To produce error free documentation for presentation to the USACE.

Plan

Utilizing the transportation and disposal flow chart (see Figure 3.4) as a guideline to ensure proper documentation review and file maintenance, OHM has developed a plan for internal peer or management review. At the corporate level, the contractor regulatory specialist (CRS) will obtain copies of all submittals concerning the USACE projects, as well as copies of all the USACE comments in response to a submittal. If the regional level review is not possible due to personnel constraints, the CRS will act as the reviewer.

Procedures

Complete and Proper Submittal

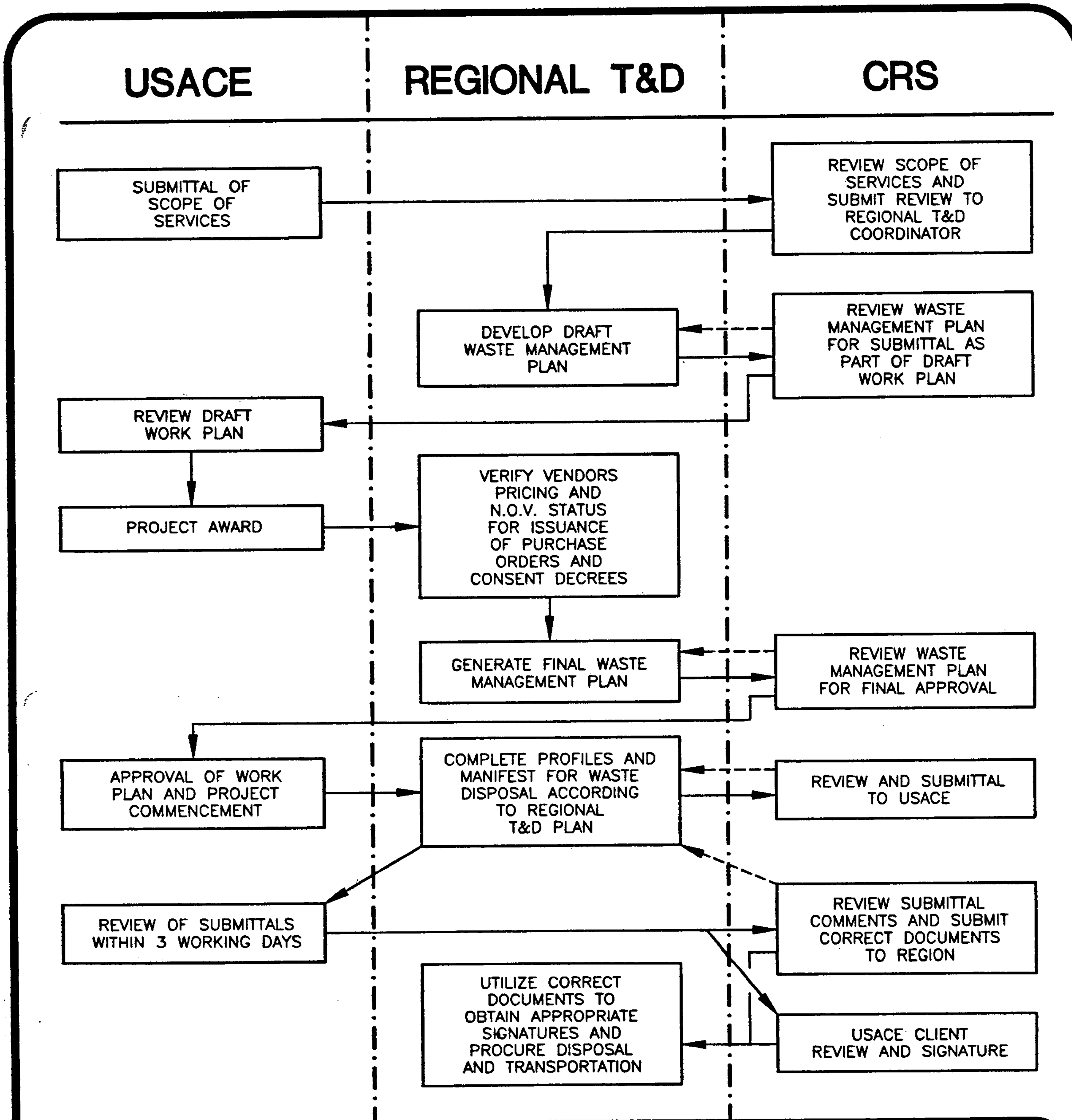
Submittals of manifests, profiles, or other documents to the USACE will arrive with the correct Rapid Form 4025. A copy of Rapid Form 4025 is included as Figure 3.5. This procedure will also be used for wastes that are confirmed to be nonhazardous or special wastes. All submittals to the USACE will be copied to Fort Riley (ATTN: Janet Wade) for concurrent review.

The section on the form for "Transmittal No." will be completed with a number referencing an alphanumeric designation for the submittal type, the delivery order number, and the submittal numbers. An example is:

- TD056001.1
  - TD = Transportation and Disposal
  - 056 = Delivery Order No.
  - 001 = the first submittal for transportation and disposal on this delivery order
  - .1 = the first submittal of these forms

When submitting a completed manifest, especially a state manifest form, the instructions for completion of the form will be included in the submittal to assist the USACE in its review.

When submitting profiles for approval, OHM will supply the USACE reviewer with an example of the manifest that will be utilized for shipment of the material, along with the CERCLA off-site approval memo to show the facility is CERCLA approved.



General Notes:

NOTE: PROCEDURES AND INFORMATION FLOW FOR SUBMITTAL OF ERROR FREE DOCUMENTATION

◄--- RETURN FOR CORRECTIVE ACTION

FIGURE 3.4

T&D FLOW CHART

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 8-27-93	Approved By:
Scale: NONE	Drawing No: 325-A19

FIGURE 3.5

TRANS TAL OF SHOP DRAWINGS, EQUIPMENT DATA, MANI TS, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

(Read instructions on the reverse side prior to initiating this form)

DATE:

TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO:	FROM:	CONTRACT NO.:	CHECK ONE: ( ) THIS IS A NEW TRANSMITTAL ( ) THIS IS A RESUBMITTAL OF TRANSMITTAL ________
SPECIFICATION SEC NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED (Manifest Description, number of pages, type size, model number, etc.) b.	MFG OR CONTR CAT, CURVE, OR MANIFEST NO. (See instruction no. 9) c.	NO. OF COPIES d.	CONTRACT SPEC/DRWG e.	NUMBER OF PAGES f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.
1.								
2.								
3.								
4.								

SECTION II - PROJECT CONTACTS AND PERSONNEL REVIEWING SUBMITTALS (This section will be initiated by the USACE-OSR and Environmental Branch)

j.	POINTS OF CONTACT: TM:	PHONE:	FAX:	ITEM NO. (Block a) p.	NAME OF TSDF q.	COMPLIANCE (YES/NC) r.	DATE CHECKED s.
k.	PE:			1.			
l.	OSR:			2.			
m.	OTHER:			3.			
n. HI REVIEW BY: (Initial) ________ DATE:		o. CHEM REVIEW BY: (Initial) ______ DATE:		4.			

REMARKS

REVIEW COMMENTS ATTACHED? ( )YES ( )NO

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract statement of work and meets all federal, state, and local laws and regulations except as other wise stated.

____

NAME AND SIGNATURE OF CONTRACTOR

SECTION III - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY	DATE

FIGURE 3.5 (CONTINUED)

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288 for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A -- Approved as submitted

B -- Approved, except as noted on drawings.

C -- Approved, except as noted on drawings.
Refer to attached sheet resubmission required.

D -- Will be returned by separate correspondence.

E -- Disapproved (See attached)

F -- Receipt acknowledged

FX -- Receipt acknowledged, does not comply
as noted with contract requirements

G -- Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

☆ U.S.G.P.O.:1990- 719-221/L0210

Submittal Pathway

The following steps are created to aid in the submittal procedures:

Step 1: Complete All Documents. A properly trained on-site coordinator, or regional transportation and disposal coordinator in the regional office will complete the documents.

Step 2: Review the Documents. The regional transportation and disposal coordinator or a peer reviews the document based upon the regional plan. If the documents are correct, proceed to Step 3, if not, repeat Steps 1 and 2 until correct.

Step 3: Obtain a Review From the CRS. If a regional review is not possible due to personnel limitations, Step 3 may replace Step 2. In either case, the CRS must receive copies of submittals from the regional transportation and disposal coordinator for review prior to submittal to the USACE. If correct, proceed to Step 4, if incorrect, repeat Steps 2 and 3 until correct.

Step 4: Submit Correct Documents to the USACE. Along with the completed Rapid Form 4025, fax the documents to Ms. Bev Graham at 402-221-7838, who will distribute the documents to the reviewer. If quick approval is required, call Mr. Ed Bave at 402-221-7685.

Step 5: Wait for a Review by the USACE. Comments will be returned to the regional transportation and disposal coordinator on the Rapid Form 4025. The comments will be in letter form in Section i. of Form 4025. The following action codes will appear in Section i:

- A--Approved as submitted
- B--Approved, except as noted on drawings
- C--Approved, except as noted, resubmission required
- E--Disapproved, (see attached comments)

If the submittal is approved, proceed to Step 6, if not, respond and resubmit as per Step 4.

Step 6: Submit the USACE's Comments to the CRS. The comments will be incorporated into the USACE corporate submittal files in order to determine commonly made errors and develop the training to prevent their reoccurrence.

Step 7: Submit Documents to Vendor Along with Other Required Information (i.e., sampling and analytical information).

The CRS will maintain a notebook of all submittals, submittal summaries, and project update forms in the corporate office for permanent record keeping purposes.

Impact

Implementation of the plan will result in zero percent error submittals to the USACE, better training and communication programs within OHM, and standardization of procedures for transportation and disposal throughout the corporation.

4.0 SUBCONTRACTOR MANAGEMENT

OHM plans to manage any procurement under this project as a traditional prime/subcontractor relationship. This includes formal subcontract agreements, fixed-price procurement, and defined work packages. OHM anticipates subcontracting transportation and disposal and laboratory analysis.

The subcontractor will report directly to the project manager or assigned designate. The project manager will also approve any reports generated by the subcontractor prior to delivery to the USACE.

OHM will formally report on subcontractor activities at intervals specified in the delivery order or as subsequently agreed upon. At this time, the USACE only requires a final report and the QC daily report. The reports will include the following:

- Narrative of work accomplished
- Obstacles or challenges and how they were overcome
- Percentage of work complete
- Estimated time of completion
- Other information as required

OHM recognizes that delivery of materials or services to the location is often a critical-path activity. Monitoring and controlling issued purchase orders are necessary to assure timely completion within the estimated budget.

Purchases of materials are anticipated for this project. Monitoring for delivery is the responsibility of the project control technician (PCT), who maintains a master log of issued purchase orders, scheduled deliveries, and actual deliveries. The PCT notifies the site supervisor, project manager, and other key project staff members of any delinquencies. Normally, the PCT will also telephone the supplier for a status report.

If the situation is not immediately corrected, the project manager will contact OHM's contracts administrator and purchasing department to develop and implement an action plan. The action plan can include invoking penalties in the subcontract or canceling the original purchase order and issuing a new purchase order to a different supplier.

5.0 PROJECT TEAM AND ORGANIZATION

The major positions and individuals responsible for this project are proposed as follows:

- Deputy Program Manager: James Darnall
- Project Manager: Phillip Connor
- Site Superintendent: Bill Fenwick
- Manger Technical Field Services: G. Jack Herzig
- Quality Assurance Officer: Guy Gallello
- Health and Safety Specialist: Gina Rejent
- Transportation and Disposal Contractor Regulatory Specialist: Mike Kinder
- Transportation and Disposal Coordinator: Hearn Tidwell

OHM will select other individuals from its staff for the following positions: truck driver, site-safety officer, on-site transportation and disposal coordinator, procurement specialist, chemist, recovery technician, equipment operator, and operations foreman.

PROFESSIONAL PROFILE

JAMES P. DARNALL

TITLE	Director, Government Services, Midwest Region
ACADEMIC BACKGROUND	B.S., Political Science/History, Bowling Green State University, 1975
EXPERTISE	Management of multidisciplinary, civil, and geotechnical engineering/remedial action projects

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Mr. Darnall rejoined OHM in June 1991. He has over 14 years' experience in the environmental-services industry, with 11 years' experience managing complex, multidisciplinary environmental programs/projects. Mr. Darnall possesses an in-depth knowledge of the preparation, negotiation, and administration of planned remedial and emergency-response cleanup projects including oil/spill cleanups, soil excavations, facility decontamination, tank removal and decontamination, contaminant sampling, drum recovery/repackaging, bioremediation, and wastewater treatment.

Mr. Darnall currently is serving as Director of Government Services for OHM's Midwest Region. As Director of Government Services, he is responsible for managing remedial and emergency response actions for the Midwest Region's state and federal government contracts including contract auditing, QA/QC, and resource allocation. He also serves as OHM's client liaison with various government clients including WPAFB, USEPA, United States Army Corps of Engineers (USACE), DOE, and DOT.

Mr. Darnall also serves as Deputy Program Manager for OHM's USACE $50 million Rapid Response and $50 million Pre-Placed Remedial Action Contracts. For these contracts, Mr. Darnall assists OHM's program manager in providing technical, management, and operations direction and staffing for projects under the contracts which require a comprehensive knowledge of all technologies and procedures employed on site including QA/QC, safety, and compliance with local, state, and federal rules and regulations. Specifically, he is involved in developing proposals/cost estimates, negotiating delivery orders; ensuring effective program communications; planning and scheduling work and resolving workload conflicts; and training project managers.

As Ohio District Manager, Mr. Darnall was responsible for the operations of a 6-state (i.e., Ohio, Michigan, Indiana, Kentucky, West Virginia, and Pennsylvania) district including project management and field operations staff. He trains, assigns, and supervises project managers for all remedial and emergency projects, provides technical and administrative control, and conducts project audits and initiates corrective actions to assure achievement of technical, schedule, cost objectives throughout the Midwest Region.

From June 1988 to June 1991, Mr. Darnall was the Vice President/General Manager for a midwestern environmental services firm. In this capacity, he was responsible for all company activities including project development and management, negotiating contracts, conducting sales and marketing, finance, and overall management of remedial services for the firm. He actively participated in major site remediation projects by assuming a key leadership role. Under Mr. Darnall's direction, this firms' waste hauling service base was expanded to include a variety of environmental remediation services. These services included environmental demolition, facility decontamination, tank cleaning and removal, excavation of contaminated soils and wastes, and hazardous waste-site cleanup and management.

Mr. Darnall served OHM in several management and field positions from February 1979 to June 1988. As Manager of OHM's Corporate Project Development Group, Mr. Darnall directed project development activities, which included personnel training, work plan development, development of project schedules, cost estimating, and preparation of bids, proposals, and qualifications and experience documents. He coordinated efforts to form seven new project development groups who efficiently produced highly technical proposals for over 1,200 projects per year. These projects ranged in value from several thousand dollars to multimillion dollar, multi-year contracts. Additionally, he evaluated the efforts of the various project development groups (i.e., engineering, proposal development, estimating, contract administration, health and safety, etc.) and made procedural adjustments to increase the rate of the group's success and initiated the development of an environmental remediation estimating database. This database reflected actual resource utilization for past projects thus increasing the efficiency, accuracy, and reliability of the schedule and cost estimating process.

As a Senior Proposal Manager, Mr. Darnall lead teams in the development of major environmental remediation projects and long-term emergency service contracts. Activities included review of available site/client data; site investigation work; establishment of work breakdown structures; development and evaluation of alternative technical approaches; estimation of projects costs; and contract and QA/QC reviews to assure procedures were strictly adhered to by various technical and operations groups. He also co-developed a computer estimating/resource scheduling program for personal computers which increased efficiency, flexibility, and reliability of the estimating process.

As Manager of OHM's sampling and field engineering group, he was responsible for all site investigations, field sampling, and waste tracking activities for remedial environmental projects. He trained personnel in water, soil, air, and waste sampling protocol; site surveying and mapping techniques; and proper documentation procedures. He designed and directed the efforts of a waste sampling, tracking, and handling program for a multimillion dollar "Superfund" project which involved the safe and effective management of over 6,000 drums of hazardous wastes. All movements and activities associated with each wastestream were successfully directed and documented to the satisfaction of the client's and various regulatory agencies' demanding surveying, mapping, and handling and documentation requirements. Additionally, Mr. Darnall developed and initiated site activities for large-scale facility decontamination projects from initial site investigations, to pilot-scale and full-scale operations. All projects were carefully documented to assure all sources of contamination had been removed; potential paths of migration were identified and investigated; and decontamination of affected areas was successful.

As an OHM Technical Foreman, Mr. Darnall was responsible for the direction of field crews on hazardous waste and material sites including drum recovery operations and containerization of debris and released chemicals. He supervised the installation of ground-water recovery systems and assisted in the setup, monitoring, and troubleshooting of wastewater treatment systems. Additionally, he supervised two projects involving the in situ biodegradation of petrochemicals and monitored the systems, including review of laboratory analyses, and performed field testing for dissolved oxygen, temperature, nutrients, and chemical levels. He recommended and implemented design and procedural changes to optimize aerobic bio-activity.

As an OHM Recovery Technician, Mr. Darnall participated in the installation and maintenance of underground recovery systems; worked with hollow-stem auger drilling crews to collect continuous soil samples and install monitoring and recovery wells; implemented ground-water and air monitoring programs including documentation of sampling and monitoring activities; and reviewed collected data.

<u>SPECIALIZED TRAINING</u>

OHM site-safety and related training

Participated in numerous training courses and seminars including spill control; site investigation; tank testing; air monitoring; bio-analytical techniques; sampling procedures; project management; finance; and technical writing

PROFESSIONAL PROFILE

Phillip R. Connor

TITLE	Senior Project Manager
ACADEMIC BACKGROUND	Juris Doctorate, John Marshall Law School, 1985 B.S., Chemical Engineering, University of Tulsa, 1968
EXPERTISE	Manage labor, material, plant, and equipment to complete remediation work on time, within budget, and as specified in the contract delivery order

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Mr. Connor joined OHM in 1993 with 23 years of experience in project management, project engineering, resident field engineering, and construction management. As a senior project manager for OHM, he is responsible for the project's scope budget, schedule and quality of services, including projects for underground systems for groundwater recovery and infiltration for the bioremediation of soils contaminated by leaks; excavation and replacement of contaminated soils; and closing hazardous waste disposal facilities. In addition, he responds to emergency cleanup situations.

Mr. Connor has been involved in remedial approach development for OHM proposals involving remedial technologies. This includes problem definition, feasibility evaluation, alternatives definition, and project estimating and scheduling. He is responsible for budgeting and cost control; scheduling personnel, equipment and subcontractor resources; client interaction; ensuring regulatory compliance; work plan development; implementing health-and-safety procedure; and overall performance on assigned projects.

Prior to coming to OHM, Mr. Connor was in involved in the following projects:

- Served as a project manager for the Chicago division of an engineering and construction contractor. He was responsible for business development and proposal activities for petroleum and chemical industry projects.

- Managed proposals for contracts with prime contractors, U.S. Armed Services, and commercial airplane manufacturers for the development and production of electromechanical aerospace control equipment and systems.

- Managed projects, budgets, schedules and quality assurance for engineering and construction service contracts. He was primarily involved with projects in the chemical process industries. Additionally, he was responsible for proposal development and negotiation.

PROFESSIONAL REGISTRATIONS/ AFFILIATIONS	Registered attorney in Illinois Illinois State Bar Association
SPECIALIZED TRAINING	OSHA 40-Hour Site-safety Training Illinois Construction Law Government contracting courses

PROFESSIONAL PROFILE

WILLIAM W. FENWICK

TITLE	Site Superintendent
ACADEMIC BACKGROUND	B.A., Sociology, Duquesne University, Pittsburgh, Pennsylvania, 1975
EXPERTISE	Extensive experience in the remediation of a wide variety of contaminants

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Mr. Fenwick joined OHM in 1988 with 12 years of prior related experience. He has directed on-scene field experience in asbestos abatement activities, oil and chemical cleanup activities, hazardous chemical waste site cleanup and disposal activities, developing site safety and work plans, equipment operation, and field construction. He has supervised extensive cleanups at manufacturing facilities, warehouses, laboratories, private residences, plating facilities, railroad terminals, factories, marinas, and open waterways. His on-site experience includes development and execution of approved work plans, development of detailed cost estimates and approved site and spill safety plans, application of heavy equipment (including trackhoes, trackloaders, backhoes, bulldozers, lasers, and the development of site-specific equipment) and field construction requirements, working in confined spaces, performance of assessments and evaluations at hazardous waste sites, and scheduling.

The following briefly highlights Mr. Fenwick's extensive experience:

- Mr. Fenwick directed a crew of 35 during the closure of the Laskin/Poplar Superfund site in Jefferson, Ohio. This site was a former greenhouse used to burn waste oils. Over the years of operation, PCB and heavy metals contamination in sludge and soil were present. Mr. Fenwick supervised the excavation and treatment of over 80,000 cubic yards of soil, clay, and stone; directed crews in the placement of a 5-acre clay and geotextile cap for site closure; installed 600 feet of ground-water diversion trench, and 450 feet of cement bentonite slurry wall; maintained day-to-day project schedules, costs, and field documentation; oversaw the implementation of health and safety protocols; and coordinated project activities with regulatory agencies.

- He supervised a crew of 15 during the decontamination of a plating facility in Northlake, Illinois. He directed crews in the excavation of 63,000 tons of methylene chloride contaminated soil; the cleanup of over 15,000 gallons of waste contaminated with acid/bases, cyanide, and metals. During this 2-month project, he participated in the development of a site safety plan along with implementation of health and safety procedures; daily cost tracking/budgeting/scheduling; and transportation and disposal coordination.

- As a site superintendent for the decontamination and demolition of sodium chromate boxes containing piping wrapped in asbestos, Mr. Fenwick was responsible for the overall development and implementation of work and safety plans; acting as a client liaison between the regulatory agencies and client; providing overall project management to ensure the smooth flow of operations; assisting the client in securing all required permits; and coordinating transportation and disposal of materials in a secure off-site landfill. Various asbestos abatement techniques implemented at this site included glove bagging and the implementation of negative air.

- As the site superintendent for a multiple-phased multimillion dollar facility decontamination/demolition project, he was responsible for developing and implementing site safety and work plans for the removal of ACM in boilers, piping, vents, roofs, and ceilings throughout the 10-acre facility. Major responsibilities included interfacing with the client to ensure project requirements were met on time and within budget; acting as a liaison between the client and the regulatory agencies; assisting the client in securing all required permits; and coordinating all transportation and disposal efforts for ACM. This project involved the implementation of a wide variety of abatement techniques including glove bagging, wrap and cut, full containment, negative air, and confined space ACM removal.

- As a site superintendent, Mr. Fenwick managed a water-treatment project which involved the treatment of 3,500,000 gallons of PCB-contaminated water. He was responsible for the overall setup of the project; implementing the appropriate treatment equipment to achieve required levels for discharge set by the Pennsylvania Department of Environmental Resources; and ensuring smooth flow of continuing operations.

- Mr. Fenwick served as the site superintendent on a project involving the removal of 1,000 gallons of styrene from a major chemical manufacturer's on-site holding pond. His responsibilities included initial site setup; startup of the treatment system; assisting in negotiations with regulatory agencies; and overall project management to ensure smooth operation of the treatment system.

- When the Wheeling Pittsburgh Steel Company inadvertently spilled 1,500 gallons of No. 2 diesel fuel in an open waterway, Mr. Fenwick was called upon to act as the site superintendent for the emergency. He immediately deployed harbor boom to contain and prevent further contamination of oil; utilized vacuum units to skim oil off the surface of the water; and used sorbent diapers to soak up the excess oil. Due to Mr. Fenwick's effective project management skills, the entire project was completed within 2 days. Responsibilities included overall management of emergency procedures; interfacing with regulatory agencies on the behalf of the client; and coordinating all transportation and disposal efforts.

- During the USEPA Superfund project in Nitro, West Virginia, Mr. Fenwick was responsible for overseeing the sampling, identification, and cleanup of a wide matrix of contaminants from the site. He was instrumental in the development and design of a burner used on this project to detonate a hydrogen cyanide cylinder. Responsibilities included overseeing compatibility testing; properly building and packaging the materials; interfacing with the regulatory agencies preparing manifests; and coordinating all transportation and disposal efforts. The entire project required the identification of contents in over 7,000 drums and the removal, overpacking, transportation, and disposal of contents from over 100 tanks.

<u>SPECIALIZED TRAINING</u>

OHM Health and Safety Training
OHM Supervisor's Training

PROFESSIONAL CERTIFICATIONS	First Aid and CPR Certified Asbestos Contractor/Supervisor Certified Asbestos Building Inspector
MILITARY SERVICE	United States Air Force; 1965 to 1968 Served in Vietnam; Awarded United States Air Force Commendation Medal Graduate of Riverside Military Academy, Gainsville, Georgia, 1964

PROFESSIONAL PROFILE

G. JACK HERZIG

TITLE	Field Analytical Manager
ACADEMIC BACKGROUND	B.S., ACS-approved degree in Chemistry, University of Toledo, 1972
EXPERTISE	Field analytical QA/QC

Since joining OHM in 1982 with 10 years' previous related experience, Mr. Herzig has been involved in the investigation, study, and supervision of more than 200 major projects ranging in size up to $5 million and has completed more than 2,600 hours of related training. An approved USEPA response manager under OHM's ERCS contract, he has directed emergency and remedial actions at numerous USEPA job sites.

Mr. Herzig is currently responsible for regulatory compliance including USEPA and DOT guidelines and project-specific field QA/QC oversight. He has developed corporate QA/QC manuals, analytical standard operating procedures, and over 50 CSAPS and QAPPs. He also provides remedial approach development and analytical/safety oversight for emergencies.

His expertise in the areas of chemical-analyses supervision, regulatory compliance, site stabilization, logistics management, and cost-estimating and control is illustrated in the following project overviews:

- Senior project chemist at a USEPA site in Puerto Rico; responsible for segregation and identification of approximately 8,000 laboratory chemicals, including those with a highly reactive/explosive nature; chemicals included a 300-pound cylinder of phosgene, 900 pounds of ether, and 35 pounds of crystallized picric acid; detonated approximately 1,000 pounds of highly reactive/explosive materials; developed and set up a separate neutralization procedure for phosgene cylinder and supervised all labpacking operations; labpacked nonreactives for disposal in the United States.

- Response manager at an ERCS site in Glen Ridge, New Jersey, requiring specialized services to finalize assessment of 12 radon-contaminated homes; supervised 15 OHM personnel throughout several phases of sampling and analysis to determine the exact extent of contamination and provide a detailed work plan for pilot removal around and underneath each of five typical properties selected by the USEPA on-site coordinator.

- Response manager for USEPA site in Logansport, Indiana, to remove wastes contaminated with acids, cyanides, and heavy metals from a metal-plating facility; designed a system for removal of 200 cubic yards of sludge from the basement of the facility; supervised 19 OHM personnel, including 5 chemists, and operation of OHM's on-site mobile laboratory; plating solutions and other contaminants were classified and bulked for transportation and disposal and the facility decontaminated.

- Response manager for a project that required a team of four OHM personnel to accompany shipments of acrolein from Taft, Louisiana, to Institute, West Virginia; shipments were transported by train every 2 weeks for 6 months in three to four 20,000-gallon tank cars with OHM personnel following shipments with all equipment necessary to react to any incident.

- As senior chemist, supervised the installation of a water-treatment system to empty a lagoon containing approximately 500,000 gallons of lead-contaminated sludge; project, located in Marianna, Florida, was completed in 3 weeks and required his supervision of 12 OHM on-site personnel.

- Senior chemist and supervisor on a project involving removal, dewatering, and packaging of low-level radioactive sludge generated by an acrylonitrile manufacturing process; heavily involved in the training and safety aspects of this project; supervised approximately 25 OHM personnel during the installation of a sludge-processing system, the dewatering of the sludge, and its packaging into a total of 6,185 fifty-five-gallon drums for disposal; assumed role of manager for the latter phases of the project.

- Senior chemist on a project requiring ground-water recovery and treatment for removal of methylene chloride in water; responsible for design and setup of water-treatment system and setup and operation of OHM's on-site mobile laboratory for methylene chloride analyses in both soil and water.

- Senior chemist at the Chem Dyne site in Hamilton, Ohio; supervised all on-site sampling, analyses, and bulking operations of materials from over 8,000 drums; ultimately responsible for approving all bulking of materials prior to off-site disposal and heavily involved in QA/QC protocol throughout the project.

- Supervised four OHM chemists during the sampling, analyzing, and bulking of waste materials from drums at the Lockhaven, Pennsylvania, site; performed and supervised compatibility testing and labpacking operations.

- Devised treatment-and-disposal techniques for toxic substances; developed a classification scheme for the identification of hazardous materials for a major waste site containing 60,000 drums of hazardous substances; designed and implemented wastewater-treatment systems and analytical-monitoring systems.

- Supervised 12 field chemists performing labpack compatibility testing, bulking, and handling at NJDEP Elizabeth, New Jersey, Chemical Control waste site.

- Served as senior project chemist at an emergency-response site involving a spill of anhydrous aluminum trichloride requiring on-site neutralization.

- Additional experience includes supervision of classification and compatibility testing of 15,000 drums of toxic waste, cyanide monitoring, identification of explosives, and supervision of waste treatment including carbon filtration, air stripping, steam-stripping flocculation, and clarification.

<u>SPECIALIZED TRAINING</u>

OHM site-safety and related training

OSHA site-safety and related training

PROFESSIONAL PROFILE

GUY GALLELLO

TITLE	Senior Project Chemist
ACADEMIC BACKGROUND	B.S., Chemistry, Boston College, 1982
EXPERTISE	Organics analysis; method development; GC, GC/MS, and HPLC instrumentation

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Mr. Gallello has 10 years of experience in analyses of environmental samples and laboratory operations. He is currently a senior project chemist with responsibilities for quality assurance plan development, oversight of OHM mobile laboratory operations, and coordination, data review, and audit of analyses performed in fixed-based laboratories. He has developed QA methods for both analytical and remedial aspects of OHM's operations. On a project-specific basis, he directs sampling activities, develops analytical programs, and performs data analysis, interpretation, and QA/QC.

Mr. Gallello was employed at OHM's affiliate laboratory ASC for 6 years and most recently was a senior chemist with the laboratory. He supervised the sample preparation area and assisted in the development of methods and supervision of analyses using HPLC, GC, and GC/MS instrumentation. He has also setup OHM field analytical units with GC/MS capabilities for volatile and TCLP/ZHE analyses.

Previously with ASC, Mr. Gallello served as a GC/MS operator, chemist, and group leader in charge of the laboratory's GC/MS group. For 2 years he directed seven analysts covering two shifts. Responsibilities included: development of work schedules, review of data packets, QA/ QC control, GC operation/maintenance, new methods development, evaluation and implementation of new analytical systems, and training of new and current personnel. He also performed methods development for GC analysis. Mr. Gallello has acted as a fixed-base field consultant on several OHM projects. Examples of analyses conducted include PCBs, resoncinol, diethylene glyocol, and MDI.

Mr. Gallello also has served as senior chemist for an USEPA contract dioxin analysis laboratory where responsible for analyses using USEPA methodology including Method 8280, "GC/MS Analysis of Dioxins."

Additional 1 1/2 years of his experience was gained as GC/MS manager for an environmental and biological laboratory. He supervised four analysts, increasing the work load 30 to 350 samples per month. He implemented GC analytical capabilities for UST monitoring programs and also participated in methods development for nonroutine analyses. Mr. Gallello's efforts led to achievement of the laboratory's certification for organic analysis in the state of Ohio.

PROFESSIONAL AFFILIATIONS	Member, American Chemical Society and American Institute for Chemists
	Member, American Society for Mass Spectrometry

PROFESSIONAL PROFILES

GINA REJENT

TITLE	Industrial Hygienist
ACADEMIC BACKGROUND	Master studies, Occupational Health, Medical College of Ohio, 1991 to present B.A. Psychology (Industrial emphasis), The University of Toledo, 1991
EXPERTISE	Analyzing site hazards and developing safety programs

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Ms. Rejent has been an Industrial Hygienist with OHM's Midwest Region since 1992. She is responsible for assessing project hazards and designing site-safety equipment and procedures and monitoring programs to minimize the hazards. Ms. Rejent reviews site data and work approaches and then prepares site-specific health-and-safety plans. These plans specify protective equipment levels, hazard control measures, work zone setups, environmental monitoring, and safety procedures for each site activity. Ms. Rejent has also developed health-hazard assessments for proposals and projects which have involved polychorinated biphenyls (PCBs), low-level radioactive compounds, explosives, pesticides, and corrosives.

Ms. Rejent supervises the implementation of site-safety plans through coordination with site-safety officers. She evaluates regional safety statistics and investigates accidents to devise corrective measures and improve performance.

Ms. Rejent has developed and directed safety programs for the following USACE projects:

- NL Industries, Granite City, Illinois--Excavation of lead-contaminated soil and battery casings

- Defense Fuel Supply Point, Escanaba, Michigan--Identification and disposal of containerized hazardous waste

- Nike Battery, Farmington, Minnesota--Removal of underground storage tanks

Ms. Rejent's prior experience includes respirator fit testing, noise level monitoring, air monitoring, and statistical analyses for a paint manufacturer.

SPECIALIZED TRAINING	OSHA 40-Hour Site-safety Training OSHA 8-Hour Annual Refresher Training

PROFESSIONAL PROFILE

MICHAEL J. KINDER, CHMM

TITLE	Transportation and Disposal Coordinator
ACADEMIC BACKGROUND	M.S. candidate, Toxicology, Memphis State University B.S., Biology, Memphis State University, 1984
EXPERTISE	Environmental regulations, hazardous-waste treatment technologies

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Mr. Kinder joined OHM in 1990 as a field chemist with 5 years of experience in environmental laboratory operation. Three years of his experience involved remedial investigation, design, and construction at HTRW sites, including the use of USEPA Level B and C protective equipment. Mr. Kinder is a certified Hazardous Materials Manager and also has formal education in toxicology, environmental regulations, OSHA safety and health, and DOT hazardous-waste transportation requirements. He has utilized his working knowledge of laws and regulations during the performance of projects for government and private-sector clients.

He has advanced to his current position as transportation and disposal coordinator for OHM's Midwest Region. In this capacity, he is responsible for procuring the most efficient and applicable technology for the disposal of wastes. He keeps current with information regarding regulatory compliance including CERCLA, RCRA, TSCA, and DOT regulations and maintains contracts with over 80 permitted facilities nationwide for quick implementation during emergency-response projects. He is also responsible for project-specific selection of vendors based on facility compliance and overall cost-effectiveness, interpreting and communicating regulatory requirements, and determining and coordinating laboratory analyses. He assists in interpretation of analytical data, identifies and obtains all required permits, completes and/or reviews all manifests and other documentation, and assists in the scheduling of waste shipments. He implements tracking procedures to ensure receipt in the time frames required and reports on these activities to the OHM project manager.

Additionally, Mr. Kinder developed OHM's transportation and disposal training manual and is a certified instructor for transportation and disposal and the OSHA Hazardous Materials Training per 29 CFR 1910.120 for OHM personnel. He has in-depth experience in immediate responses and field waste characterization and bulking procedures from his experience as a field chemist. He is thoroughly familiar with analytical procedures in environmental laboratory management and operation of OHM mobile laboratories.

The following paragraphs present Mr. Kinder's project experience:

- During a building decontamination/decommission, Mr. Kinder coordinated the transportation and disposal efforts within a 2-week time frame so that the client could dismantle the fertilizer blending department of a plant and dispose of the debris prior to the May 8, 1993, debris exemption expiration. Over 200 yards of metal, piping, PPE, visqueen and other debris were properly profiled, waste codes assigned, manifested, and shipped prior to the deadline.

- For a USACE project in Granite City, Illinois, Mr Kinder utilized on-site tracking techniques as well as in office tracking programs to manage and track the disposal of over 3,000 tons of lead contaminated material as well as 3,000 tons of non-hazardous material.

- Mr. Kinder managed transportation and disposal during the performance of a USACE project involving the investigation and remediation of lead-contaminated soils around five water towers at the Crab Orchard Wildlife Refuge in Marion, Illinois. During the project, OHM provided characterization sampling to determine if excavation of soils was necessary and verification sampling to ensure soils were remediated to the clean up criteria. Mr. Kinder procured and oversaw the transportation and disposal of 1,500 yards of lead-contaminated soil at a RCRA, Subtitle C landfill and stabilization facility that was in compliance with all federal and Illinois State requirements. He also arranged the disposal of approximately 3,000 yards of nonhazardous special waste from the same site. An expedited state Special Waste Certification was required to meet the time frame of disposal. Mr. Kinder successfully completed and achieved a 21-day turnaround time from the state. This process generally requires 60 to 90 days from submittal.

- Also as a regulatory specialist, he coordinated the transportation and disposal of 176 drums from a USACE project site in Escanaba, Michigan. The drums contained wastes that were contaminated with lead, benzene, and creosote. Mr. Kinder coordinated receipt and analyses of samples, instructed field personnel in bulking and packaging requirements, tracked waste shipments, and completed manifest packages and reports for project management.

- At a USEPA Region V ERCS site in Detroit, Michigan, Mr. Kinder supervised three chemists and four sampling technicians in the removal of containerized waste from a plating facility. On-site waste characterization was performed using a mobile laboratory. Mr. Kinder performed QA/QC of analytical results and developed a container consolidation scheme. He also directed personnel in handling, packaging, and labeling of waste and scheduled transportation and disposal.

SPECIALIZED TRAINING

OSHA site-safety and related training
Certified Hazardous Materials Manager, 1991
24-hour Hazardous Waste Site Operation Safety Training

PROFESSIONAL PROFILE

HEARN W. TIDWELL, III, CHMM

TITLE	Project Chemist II
ACADEMIC BACKGROUND	B.S. Environmental Science, Middle Tennessee State University, 1989
EXPERTISE	Transportation and disposal of hazardous and non-hazardous wastes

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Mr. Tidwell joined OHM in 1983 with 7 years of previous experience in hazardous waste management. He has since advanced to his current position as transportation and disposal coordinator for OHM"s midwest Region. In this capacity he is responsible for procuring the most efficient technology applicable for transportation and disposal of hazardous and non-hazardous wastes. He keeps current with information regarding regulatory compliance including CERCLA, RCRA, TSCA, AND DOT regulations and maintains contacts with over 80 permitted facilities nationwide for quick implementation during emergency-response projects.

In his position as a Chemist he was responsible for the direct supervision and training of sample technicians in OHM's Midwest Region. Related duties included preparation of detailed sampling and analysis plans or government and private sector clients, and quality assurance of on-site activities including RI/FS, RCRA closures, and litigations involving potentially responsible parties. He previously served as a site supervisor and as a foreman with OHM. In these roles he provided on-site supervision of multidisciplinary hazardous material cleanup crews, and all related equipment operations including ground-water recovery and treatment, biodegradation, drum recovery, tank removal and decontamination, structural decontamination, bulking of wastes, sampling, demolition, drum repacking, air monitoring, PCB decontamination, contaminant sampling, and soil excavation.

He has extensive regulatory knowledge gained through his supervision of several Superfund projects. Mr. Tidwell's experience with government installations and private sector clients includes activities at petrochemical and pharmaceutical manufacturing facilities, landfills, railyards, warehouses, and municipal airports. He has supervised site assessments and emergency-response and remediation projects.

A list of projects supervised by Mr. Tidwell while at OHM includes the following:

- Directed on-site multidisciplinary professionals, operators, and laborers in the decontamination of PCBs at an electric utility. The project required high pressure application of Freon to four aircraft jet engines, eight generators, the control room, and building structure. Total project cost was $1.7 million and was 8 weeks in duration.

- Supervised 39 on-site personnel in PCB and mercury building decontamination of a manufacturing facility. The project required high pressure washing/rinsing of over 250,000 square feet of floor and the cleaning of lights, pipes, rafters, and machinery. Water from the rinsates was collected, treated, and discharged into the municipal water system.

- Supervised on-site personnel in the mercury decontamination of a large passenger aircraft at a major city airport. Dismantled and vacuumed interior of the passenger cabin and the cargo area. Aircraft was X-rayed to verify decontamination.

- Supervised on-site personnel and operations at a ground-water contamination incident involving a gasoline spill 400 feet from the municipal water supply wells. Product was recovered, monitoring wells were established, and the water was treated and discharged into the local municipal wastewater-treatment plant. The total project cost was $1.4 million and the duration of the project was 9 months.

- Directed on-site personnel and operations of a dioxin-contaminated manufacturing facility. The project required vacuuming dust from 10,000 square feet of floors, walls, ceilings, rafters, and machinery and the permanent storage of wastes.

- Directed personnel and equipment in the decontamination of a PCB-contaminated public rail utility maintenance shop. Scarified, vacuumed, and sealed 5,000 square feet of concrete maintenance pits.

<u>SPECIALIZED TRAINING</u>

OSHA site-safety and supervisor training
CPR and First Aid, American Red Cross
Certified Hazardous Materials, Manager, Master level, achieved through the Institute of Hazardous Materials Management in August 1992.

EXHIBIT I

FINAL SCOPE OF WORK

FINAL SCOPE OF WORK

FOR

RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS

PESTICIDE STORAGE FACILITY AND COLYER MANOR SITE, FORT RILEY, KANSAS

DACW45-94-D-0005 DELIVERY ORDER NO. 2

JANUARY 19, 1994

TABLE OF CONTENTS

1. **Introduction.**

1.1. **General.** This Rapid Response project will consist of contaminated soil removals at two sites at Fort Riley, Kansas: the Pesticide Storage Facility, and Colyer Manor. At the Pesticide Storage Facility, the primary contaminants to be removed are DDT, Dieldrin, Heptaclor, Arsenic, Chlordane and PAH's. At the Colyer Manor, the contaminant to be removed is lead. The purpose of the remedial actions at each of the sites is to remove all soils containing contaminants above the cleanup levels specified within this scope of work (SOW) to achieve closure. Work tasks consist of: development of work, sampling, and safety plans; excavation; characterization of excavated soils; confirmatory sampling and analysis; transportation and disposal of excavated soils; and site restoration.

1.2. **Project Request.** The United States Army Corps of Engineers, Kansas City District, on behalf of Fort Riley, requested that the Omaha District, Corps of Engineers utilize the Rapid Response Program to execute removal actions at the Pesticide Storage Facility and the Colyer Manor site. The Omaha District reviewed and accepted this project based on a moderate risk to human health, a moderate risk to a drinking water source of the environment, and to achieve compliance with current regulations. This SOW is issued to OHM Corporation to specify the plans, field work and necessary documentation required to complete this project as a delivery order to their Rapid Response Contract (DACW45-94-D-0005, Delivery Order 2). A construction act, cost plus fixed fee delivery order, with this SOW as an attachment, will be issued to OHM Corporation to provide the contractual mechanism to complete this project.

1.3. **Location.** Fort Riley is located in northeast Kansas. The Pesticide Storage Facility is located in the Main Post and Colyer Manor is located in Camp Forsyth. Refer to APPENDIX A - SITE MAPS for a map of Fort Riley and site maps for the Pesticide Storage Facility and the Colyer Manor site.

1.4. **Site Description.**

1.4.1. **Pesticide Storage Facility.** The Pesticide Storage Facility (PSF) is identified by Building Number 348. Contaminated soils to be excavated exist east of Building 348. The area is bounded on the east by a fence; however, contamination exists outside the fenced area. The area to be excavated is generally flat and covered with gravel up to the fence. Beyond the fence the terrain drops off sharply into a ravine.

1.4.2. **Colyer Manor.** Colyer Manor is a generally flat housing area in Camp Forsyth. Contaminated soils to be excavated are north of the housing area at the base of a hill. A drainage swale exists between the area to be excavated and nearby housing units. The general area to be remediated under this delivery order is delineated in APPENDIX A and will be referred to in this SOW as the "Colyer Manor Site".

1.5. Site History.

1.5.1. Pesticide Storage Facility. The Pesticide Storage Facility was constructed in 1941 to serve as a general warehouse facility. The building has been used to store pesticides and herbicides since at least 1973. In 1984 the facility was modified to meet federal standards for safe storage of pesticides.

1.5.2. Colyer Manor. The lead contaminated soil area of concern for this project was first identified as an area suspected of being contaminated with lead bullet fragments in 1992 in the Installation Wide Site Assessment. In 1993, the area was investigated and found to be significantly contaminated with lead.

2. Tasks. The Contractor shall identify and adhere to all legally applicable or relevant and appropriate requirements (ARAR's) for this project. The Contractor shall develop the plans, cost proposal and perform the work based on the following tasks:

2.1. Task 1 - Site Visit. On December 1, 1993, personnel from the Kansas City District Corps of Engineers, the Omaha District Corps of Engineers, Fort Riley DEH, and OHM Corporation met at the site to discuss this remediation project. Refer to APPENDIX B - SITE VISIT REPORT for a summary of the site visit and a list of participants. The Contractor shall be reimbursed for costs associated with this site visit including the development of the site visit report.

2.2. Task 2 - Project Work Plan Development. The Contractor shall prepare the project work plan. Portions of the plan are discussed below. This plan shall include a detailed discussion of the technical approach the Contractor plans to use to implement the requirements specified herein and in accordance with Contract Number DACW45-94-D-0005 and the negotiated Advanced Agreements to this contract. The plan must be reviewed and approved by the Contracting Officer and applicable regulators prior to commencement of the work. Refer to SECTION 4 - "REVISIONS AND ADDENDA" for details on how to revise the project plan. The Contractor shall prepare the following sections to the project work plan:

2.2.1. Site Safety and Health Plan (SSHP). The Contractor shall prepare a project specific SSHP in accordance with the requirements specified in APPENDIX D - HEALTH AND SAFETY INSTRUCTIONS.

2.2.2. Chemical Sampling and Analysis Plan (CSAP). The Contractor shall prepare a project specific CSAP in accordance with the requirements specified in APPENDIX E - CHEMISTRY INSTRUCTIONS.

2.2.3. Site-Specific Advanced Agreements (SSAA). The Contractor shall specify any relevant Site-Specific Advanced Agreements, if necessary. This document shall be included in the Cost Proposal to be negotiated and agreed upon by the Government and the Contractor. The costs associated with developing and negotiating the Site-Specific Advanced Agreements are not reimbursable.

2.2.4. **Work Plan (WP).** The Contractor shall prepare a WP which discusses each specific task required by this Scope of Work (SOW) and explains how the Contractor plans to implement its resources to fulfill all the requirements of this SOW. A schedule shall be developed and included in the WP which presents the length of the individual tasks, interrelationship between tasks and other key milestones, and included in the WP. The WP shall discuss permits, licenses, and certificates and state name, identification number, and location of the disposal facility, if necessary. The Contractor shall be responsible for assuring that all work performed during the execution of this delivery order is executed in accordance with all legally applicable or appropriate and relevant requirements and in accordance with the Final Work Plan. The WP shall contain a section outlining key personnel (including their resumes) to be used on the project and their responsibilities. Key personnel shall be defined as all salaried professionals (both on-site and home office), the site supervisor, and any wage grade personnel key to the execution of the delivery order. The Contractor shall notify the USACE Technical Manager of any changes in key personnel during the course of the execution of this delivery order within 24 hours of such change.

2.2.5. **Cost Proposal.** The Contractor shall develop and submit the cost proposal by the date stated in SECTION 11 - SCHEDULE. The Contractor shall not be reimbursed for expenditures incurred during the Cost Proposal's preparation and negotiation. The Delivery Order Cost Proposal shall be prepared based on this Scope of Work. The Cost Proposal shall provide a time-phased breakdown for each "TASK" based on Direct Costs including labor, equipment, materials, subcontracts, and indirect costs including overhead and G&A expenses. The Wage Rates to be used, as determined by the U. S. Department of Labor, are included in this Scope of Work in APPENDIX G - LABOR AND WAGE RATES. Also included in this SOW, in APPENDIX H - SALES AND USE TAX, is the appropriate tax information to be used as determined by our Office of Counsel. The Contractor shall provide sufficient cost and pricing data in the Cost Proposal, including catalog prices or/and market prices. At a minimum, for subcontracts greater than $10,000, the Contractor shall provide three independent quotes and justification of selection. In addition, the Contractor shall submit three independent bid quotes for lodging to be used during on site activities. The Contractor shall provide estimated production rates of all heavy equipment planned to be used during this project. The Cost Proposal shall be submitted (as specified in APPENDIX F - SUBMITTAL REGISTER) to CEMRO-CT-H/Daubman.

2.3. **Task 3 - Mobe/Demobe.**

2.3.1. **Mobilization.** The Contractor shall mobilize all necessary equipment, personnel and materials to the project site which are needed to successfully complete the requirements of this SOW and other contract documents. The Contractor shall specify the equipment, personnel, material to be mobilized, their respective location from which mobilization will occur, and anticipated travel time, in the Work Plan. **This project is anticipated to require two phases. Specify in the Work Plan the equipment, personnel and materials to be mobilized for each phase.**

2.3.2. **Demobilization.** The Contractor shall demobilize all Contractor personnel, equipment and unused materials from the project site once all field work has been completed.

2.4. **Task 4 - Site Preparation.** The Contractor shall obtain all necessary permits and licenses needed for successful completion of this project. The Contractor shall provide equipped offices and utilities necessary for the project, coordinating clearances and hookups, and provide all labor, equipment and materials necessary to construct decontamination pads, temporary storage pads, and to demarcate work zones. The Contractor shall specify the materials to be used in the construction of decontamination pads and temporary storage pads and their respective locations in the WP. **At the Pesticide Storage Facility, the Contractor shall remove fencing west of Building 348 and install temporary fencing and erosion protection. Refer to APPENDIX A, Figure 2 for approximate locations of fence removal, temporary fencing, and erosion protection. The Contractor shall specify in the Work Plan the locations of fence removal; and the location, type, and installation procedures for the temporary fence and erosion protection. At Colyer Manor, the Contractor shall provide a temporary haul road to access the site, and install temporary fencing to inclose an area for equipment staging and the contamination reduction zone. The Contractor shall specify in the Work Plan the location, materials and installation procedures of the temporary fence, haul road and contamination reduction zone.**

2.5. **Task 5 - Sampling and Analytical Testing.** The Contractor shall perform all chemical sampling and analytical testing as specified in APPENDIX E - CHEMISTRY INSTRUCTIONS.

2.6. **Task 6 - Excavate Lead Contaminated Soils at the Colyer Manor Site.** The Contractor shall excavate all soils **above 5 feet below ground surface** from the Colyer Manor Site which contain lead concentrations above the action level prescribed in APPENDIX E - CHEMISTRY INSTRUCTIONS. Excavated soils shall be placed on temporary storage pads. The Contractor shall propose in the Work Plan the staging location of the excavated soils and include construction details of the temporary storage pad. The Contractor shall protect the staged contaminated soils from runoff and precipitation and describe in the Work Plan how the staged soils will be protected from the elements. Prior to excavation, the Contractor shall determine the initial excavation limits through sampling and ~~on-site~~ analysis with an XRF. Following the initial excavation, the Contractor shall sample and analyze (with the XRF) the excavation, and remove additional soils as necessary until all soils containing lead contamination above the action level have been removed. The Contractor shall then perform confirmatory sampling and analysis in accordance with APPENDIX E - CHEMISTRY INSTRUCTIONS. After receiving confirmatory analytical results indicating all soils containing lead concentrations above the action level have been removed, the Contractor shall ~~regrade the area to assure drainage.~~ **restore the site in accordance with APPENDIX J - SITE RESTORATION INSTRUCTIONS.**

A drainage swale exists between the area to be excavated and nearby residential housing. The Contractor shall restore this drainage swale to its original grade following the completion of excavation and regrading activities.

2.7. Task 7 - Excavation of Pesticide Contaminated Soils at the Pesticide Storage Facility (Building 348). The Contractor shall remove all soils from the Pesticide Storage Facility Site which contain pesticide and arsenic concentrations above the action levels prescribed in APPENDIX E - CHEMISTRY INSTRUCTIONS. Excavated soils shall be placed on temporary storage pads. The Contractor shall propose in the Work Plan the staging location of the excavated soils and include construction details of the temporary storage pad. The Contractor shall protect the staged contaminated soils from runoff and precipitation and describe in the Work Plan how the staged soils will be protected from the elements. The Contractor shall propose in the Work Plan the excavation limits. Following excavation, the Contractor shall perform confirmatory sampling and analysis in accordance with APPENDIX E - CHEMISTRY INSTRUCTIONS. The Contractor shall perform additional excavation, and confirmatory sampling and analysis until analytical results indicate all soils containing contamination above the prescribed action levels have been removed.

Soils under existing asphaltic or concrete pavements shall not be excavated. Soils excavations shall be to a maximum of 5 feet below ground existing ground surface. Near buildings, all soils above the top of the spread footing shall be excavated. From the top of the spread footing, excavation shall proceed away from the foundation on a 1:1 slope or as appropriate based on the soil conditions.

Following completion of all excavation and upon receipt of confirmatory analytical results indicating all soils containing contamination above the prescribed action levels have been removed, the Contractor shall restore the site in accordance with APPENDIX J - SITE RESTORATION INSTRUCTIONS.

~~Prior to excavation, the Contractor shall abandon monitoring wells inside the excavation limits in accordance with State of Kansas regulations. In addition, the Contractor shall remove fencing as needed to perform the excavation.~~ Following site restoration as described in APPENDIX J, the Contractor shall replace fencing removed to match original conditions.

2.8. Task 8 - Transportation and Disposal. All contaminated soils excavated from each of the sites (Pesticide Storage Facility and the Colyer Manor Site) shall be transported and disposed from their respective sites in accordance with the requirements contained in APPENDIX L - TRANSPORTATION AND DISPOSAL INSTRUCTIONS. In addition, the Contractor shall dispose of 20, 55 gallon drums of soil cuttings generated during previous investigations at the Pesticide Storage Facility in accordance with APPENDIX L. All decontamination liquids and other contaminated solid waste generated during the execution of this project shall be ~~added to the soil piles for disposal.~~ **disposed in accordance with APPENDIX L.**

2.9. Task 9 - Final Project Report. The Contractor shall submit a Final Report within three weeks of completion of the on-site work accomplished for this delivery order. Refer to SECTION 3.8 - FINAL REPORT for specific requirements for the Final Report.

3. **Submittals.** Documents submitted in performance of this Delivery Order shall be prepared on commercial grade bond paper. Documents shall be mailed via a carrier service that will provide overnight service, such as Express Mail, unless otherwise noted on APPENDIX F - SUBMITTAL REGISTER. The Contractor shall check one week prior to the submittal date for changes to APPENDIX F with the U. S. Army Corps of Engineers Technical Manager USACE-TM. The Contractor shall prepare and submit the following documents:

3.1. **Draft Project Work Plans.** Submit the following documents by the date shown in SECTION 11 - SCHEDULE and in accordance with APPENDIX F. All work plans shall be submitted as one document.

3.1.1. Draft Site Safety and Health Plan (SSHP).

3.1.2. Draft Contractor Sampling and Analysis Plan (CSAP).

3.1.3. Draft Work Plan

3.1.4. Cost Proposal

3.1.5. Site-Specific Advanced Agreements (SSAA).

3.1.6. OHM Corporation Literature/Brochure

3.2. **Final Project Work Plans.** Upon conclusion of negotiations, the Contractor shall submit the Final Project Work Plans which shall incorporate all the above work plans, review comments, and corrections from the negotiation within 5 days upon conclusion of negotiations, or as otherwise determined during negotiations. Procedures for revisions are discussed in paragraph, "REVISIONS AND ADDENDA."

3.3. **Daily Submittals.** Daily submittals shall be submitted to the CE on-site representative at the close of business, daily. All daily submittals shall be available for electronic transmittal to the Omaha District Offices at the close of business, daily. Daily submittals include:

3.3.1. **Rapid Response Quality Control Daily Report.** This form is provided in APPENDIX I - PROJECT FORMS.

3.4. **Weekly Status Report.** The Contractor shall submit a weekly progress no later than 10:00 A.M. Central Standard Time the following Tuesday after the week being reported on. The reports shall be telefaxed to the locations specified in Table 1 and then a hard copy of the report shall sent via regular mail. The Weekly Status Report shall be transmitted weekly from delivery order award until demobilization. At that time the report shall be transmitted bi-weekly until final payment is made. The Weekly Status will include the following information:

3.4.1. Project name.

3.4.2. Date of report.

3.4.3. Name, title, telephone number, telefax number, address, and company name of the person completing the report.

3.4.4. Summary of work performed for the project during the report period, both on site and off site.

3.4.5. Explanation of any deviations from the scope of work and/or the Workplan (including modifications and schedule slippages).

3.4.6. Discussion of all problems encountered and potential impacts of these problems on the project.

3.4.7. Recommendations to overcome problems and/or get the project on schedule.

3.4.8. Key personnel changes.

3.4.9. Work anticipated to be performed the following week.

3.4.10. Percent of field work complete.

3.4.11. Percent of project complete.

3.4.12. Conversation records with regulatory agencies.

3.4.13. Tabulated waste handling information including samples taken, results, transportation plans, disposal facility, etc; if applicable.

3.4.14. Submittal of Hazardous Waste Manifests, Waste Profile Sheets, and Land Disposal Restriction forms that were signed and submitted to the laboratories, disposal facilities or transporters during the week.

3.4.15. Weekly cost summary, which includes a breakdown of daily and weekly expenditures, as well as a total of expenditures to date.

3.5. **Final Report.** Draft and Final copies of the Project Report shall be submitted. While all submittals should be error-free, an extra effort shall be made to provide an error-free Final Project Report. The Draft Project Report shall be submitted by the date shown in SECTION 11 - SCHEDULE. The Project Report shall include (if applicable) but not limited to:

3.5.1. **Summary of Work Performed.** Summary of work performed including, but not limited to:

3.5.1.1. Narrative of the Scope of Work (including project objectives, mobilization and demobilization, site setup, site operations);

3.5.1.2. Safety;

3.5.1.3. Quality control;

3.5.1.4. Recommendation, lessons learned;

3.5.1.5. Conclusions;

3.5.1.6. Any other unique or special tasks performed or situations documented.

3.5.2. **Supporting Data.** The tabulation of criteria, data, circulations, etc., which are performed but not included in detail in the report shall be assembled as appendices. Criteria information provided by the Omaha District need not be reiterated, although it should be referenced as appropriate. The Appendices shall include but not be limited to:

3.5.2.1. The final Scope of Work.

3.5.2.2. Completed permits and verbal conversation records concerning any permitting.

3.5.2.3. Licenses.

3.5.2.4. Hazardous Waste Manifests, Waste Profile Sheet, shipping documents, Land Disposal Restriction Certification and Notification, Federal and State Annual and Biennial reports, TSCA Annual Reports, Certifications of Disposal for PCBs and Exception Reports.

3.5.2.5. Rapid Response Daily Work Order.

3.5.2.6. Rapid Response Quality Control Daily Report.

3.5.2.7. Sampling and Analysis Documentation and Results.

3.5.2.8. Chain-of-Custody Records.

3.5.2.9. Photo Documentation.

3.5.2.10. Cost data, if cost reimbursable.

3.5.2.11. List of visitors.

3.5.2.12. Project Points of Contact address and phone (including Site Manager, T&D Contractors, Subcontractor names, USACE-PM, Ft Crook personnel, etc.).

3.5.2.13. Survey reports and backup notes.

3.5.2.14. Completed Verbal Conversation Records especially ones that either impact the Scope of Work, Cost Proposal, or Final Report.

3.5.2.15. Finalized versions of the transportation and disposal and the analytical results summary tables.

3.5.2.16. Weekly reports.

3.6. **Partial Submittals.** Partial submittals will not be accepted unless prior approval is given.

3.7. **Covers Letters.** A cover letter should accompany each document and indicate the project, project phase, the date comments are due, to whom comments are to be submitted, the date and location of the review conference, etc., as appropriate. (Note that, depending on the recipient, not all letters will contain the same information.) The contents of the cover letters should be coordinated with the USACE-TM prior to the submittal date. The cover letter shall not be bound into the document.

3.8. **Covers.** The report covers shall be durable 3 ring binders which hold pages firmly while allowing easy removal, addition, or deletion of pages. A report title page shall identify the report title, the Corps of Engineers and the date.

4. **Revisions and Addenda.** Review comments issued prior to Government approval shall be incorporated by revising and reissuing affected pages. If major revisions are necessary, the entire Plan shall be resubmitted. Minor changes affecting only a few pages may be made by addenda sheets. The affected pages shall have the revision number and date of correction on the bottom-right corner of the page.

Any changes to the project work plan shall be accompanied by a cover sheet with a list of pages that have been revised. The revised pages that the Contractor issues shall cover any additions or changes to the plans or reports. The addendum for the project plan shall be issued prior to the commencement of work for that phase.

5. **Project Management.** The Contractor shall assign an employee who will serve as the Project Manager (PM). This individual will oversee the coordination of the entire project, administer all instructions from the USACE-PM and obtain answers to all questions from the USACE-TM during and after the work. The PM will be named by the Contractor and approved by the USACE in accordance with the Advance Agreement No. 8 - Key Personnel.

6. **Security.** The Contractor shall maintain and secure the sites during all site operations. Any excavation openings shall be clearly marked and protected. **The Contractor is responsible for the security of Contractor owned equipment and materials to be used for this project.**

7. **Review of Progress and Technical Adequacy.** At any appropriate time, representatives of the Contracting Officer (CO) may review the progress and technical adequacy of the Contractor's work. Such review shall not relieve the Contractor from performing all contract requirements, except as may be waived

by written instructions. The Contractor, under this contract, will interpose no objection nor restriction to the Contracting Officer's designation of a Contractor for the purpose of reviewing the adequacy and corrections of the work performed under this contract.

8. **Conference Notes and Annotated Comments.**

8.1. **Conference Notes.** The Contractor shall be responsible for taking notes and preparing the reports of all conferences, if required. Conference notes shall be prepared in typed form and the original furnished this office (within seven (7) work days after date of conference) for concurrence and distribution to all attendees. This report shall include the following items as a minimum.

8.1.1. The date and place the conference was held with a list of attendees. The roster of attendees shall include name, organization, and telephone number.

8.1.2. Comments made during the conference, decisions affecting criteria changes, must be recorded in the basic conference notes. Any augmentation of written comments should be documented by the conference notes.

8.2. **Annotated Comments.** Written comments presented by the reviewers of the project submittals shall be formally addressed and annotated by the Contractor. Annotated comment action shall be "A" for an Approved comment, "D" for a Disapproved comment, "W" for a comment that has been Withdrawn, and "E" for a comment that has an Exception noted. In addition, brief written responses to comments shall be added where appropriate. Annotated comments shall be submitted as an attachment to the cover letter transmitting the revised submittal or included in an appendix to the revised submittal.

9. **Applicable Publications.** Work performed shall be consistent with this SOW and with the following guidelines and references and in compliance with all applicable regulations and standards including, but not limited to, those listed below. In the case that these requirements are conflicting, the one which offers the greatest protection shall be followed.

9.1. U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, issued October 1992.

10. **Attached Requirements.** All field, laboratory, and reporting requirements associated with this delivery order shall be completed in accordance with the appendices to this SOW. If conflicts in specifications or methodology exist between the attached requirements, the Contractor shall immediately notify the USACE-TM for clarification. Conflicts between this SOW and those desired by the Contractor shall be brought to the attention of the USACE-TM for clarification and approval.

11. Schedule.

Site Visit	1 December 1993
Scope of Services Issued	17 December 1993
Cost Proposal and Plans Submitted	7 January 1994
Negotiations	18 January 1994
Delivery Order Award	28 January 1994
Begin Initial On-Site Work	24 January 1994
Complete All Site Activities	9 April 1994

APPENDIX A

SITE MAPS

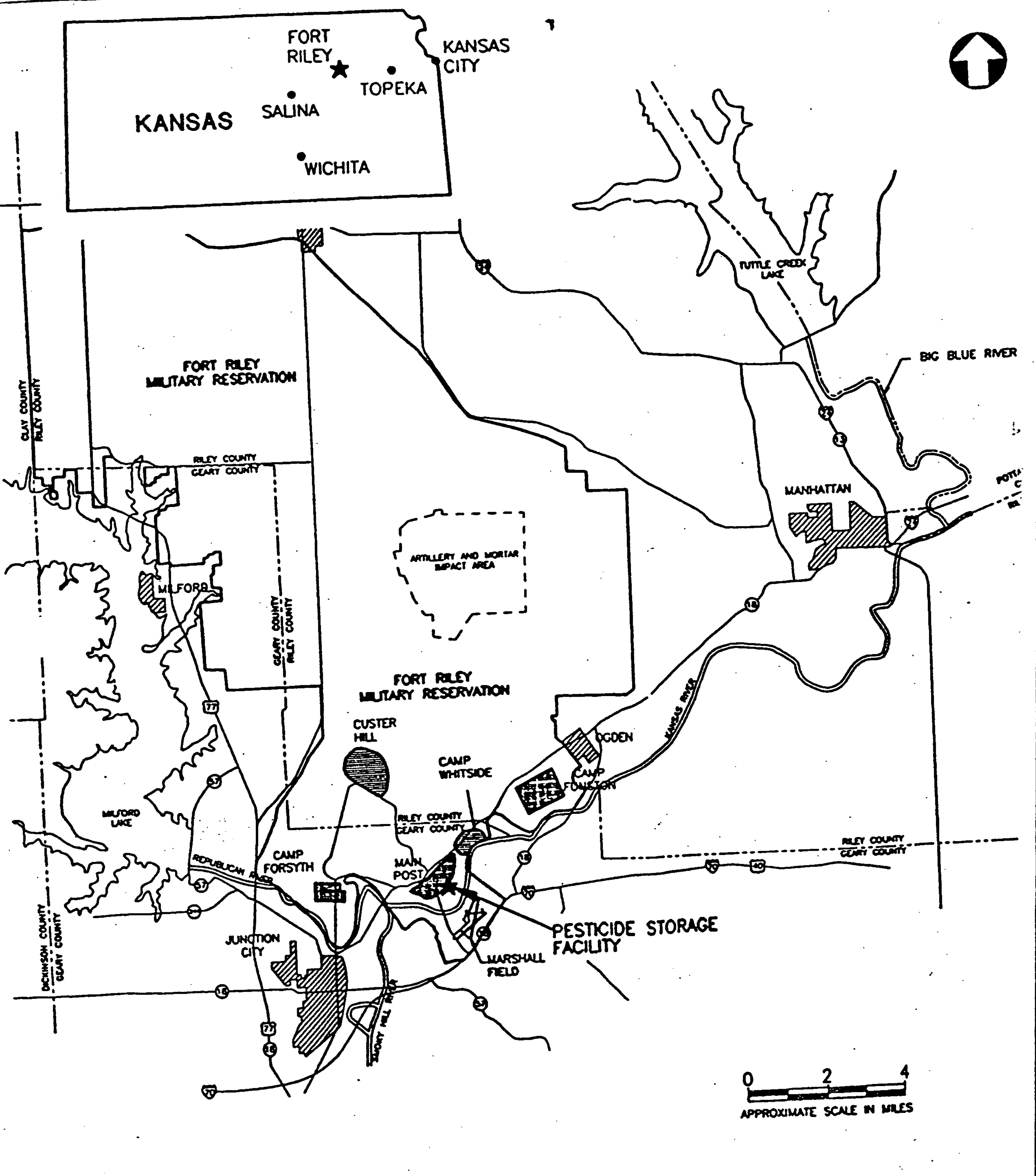

FORT RILEY
KANSAS CITY
TOPEKA
SALINA
KANSAS
WICHITA
TUTTLE CREEK LAKE
BIG BLUE RIVER
FORT RILEY MILITARY RESERVATION
CLAY COUNTY
RILEY COUNTY
RILEY COUNTY
GEARY COUNTY
MANHATTAN
ARTILLERY AND MORTAR IMPACT AREA
MILFORD
GEARY COUNTY
RILEY COUNTY
FORT RILEY MILITARY RESERVATION
KANSAS RIVER
CUSTER HILL
OGDEN
CAMP WHITSIDE
CAMP FUNSTON
MILFORD LAKE
RILEY COUNTY
GEARY COUNTY
RILEY COUNTY
GEARY COUNTY
CAMP FORSYTH
REPUBLICAN RIVER
MAIN POST
PESTICIDE STORAGE FACILITY
JUNCTION CITY
MARSHALL FIELD
DICKINSON COUNTY
GEARY COUNTY
SMOKY HILL RIVER
0 2 4
APPROXIMATE SCALE IN MILES
filename: pest/f

FIGURE 1

~~FIGURE 1-2~~

PESTICIDE STORAGE FACILITY
FORT RILEY, KANSAS

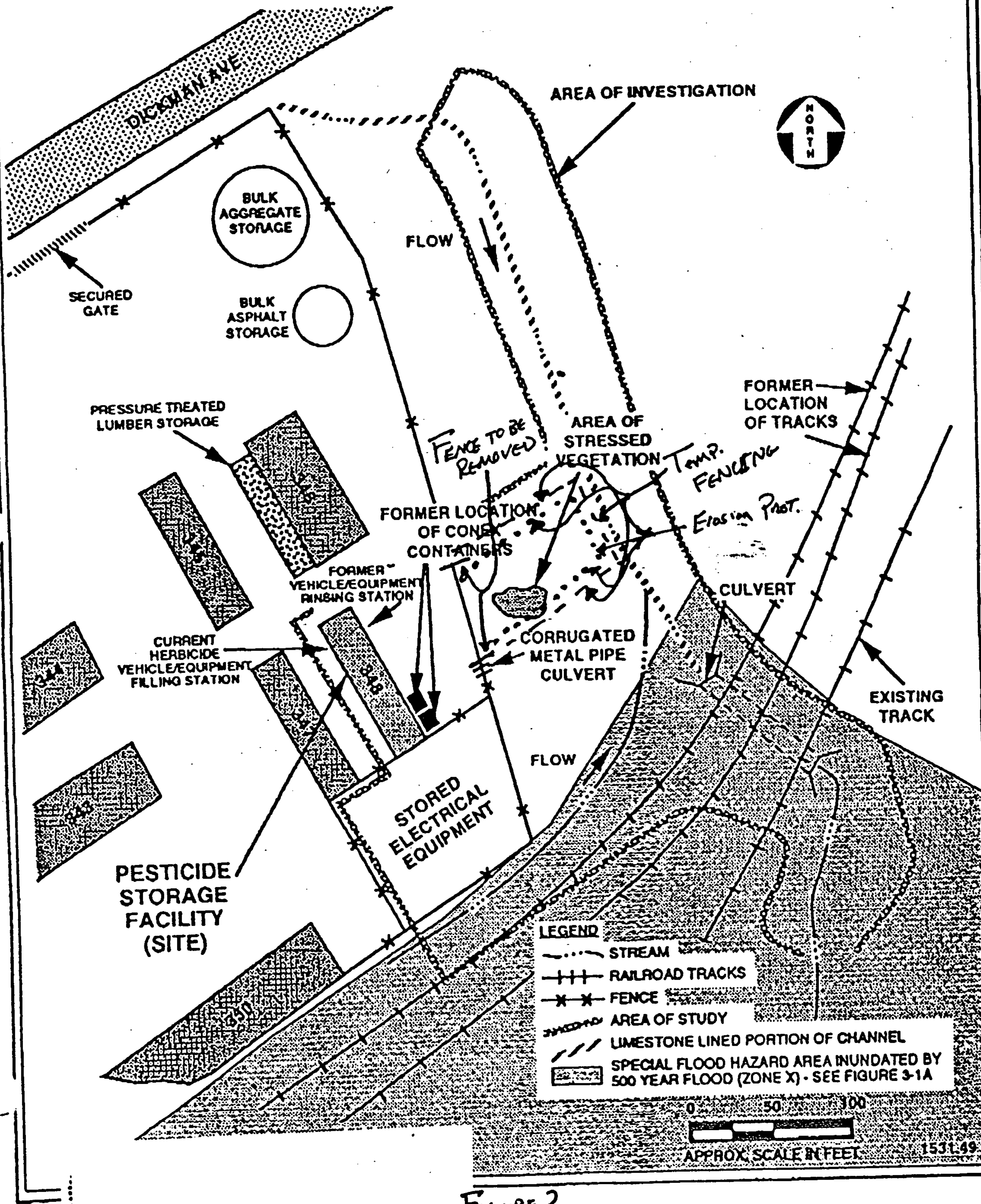


FIGURE 2

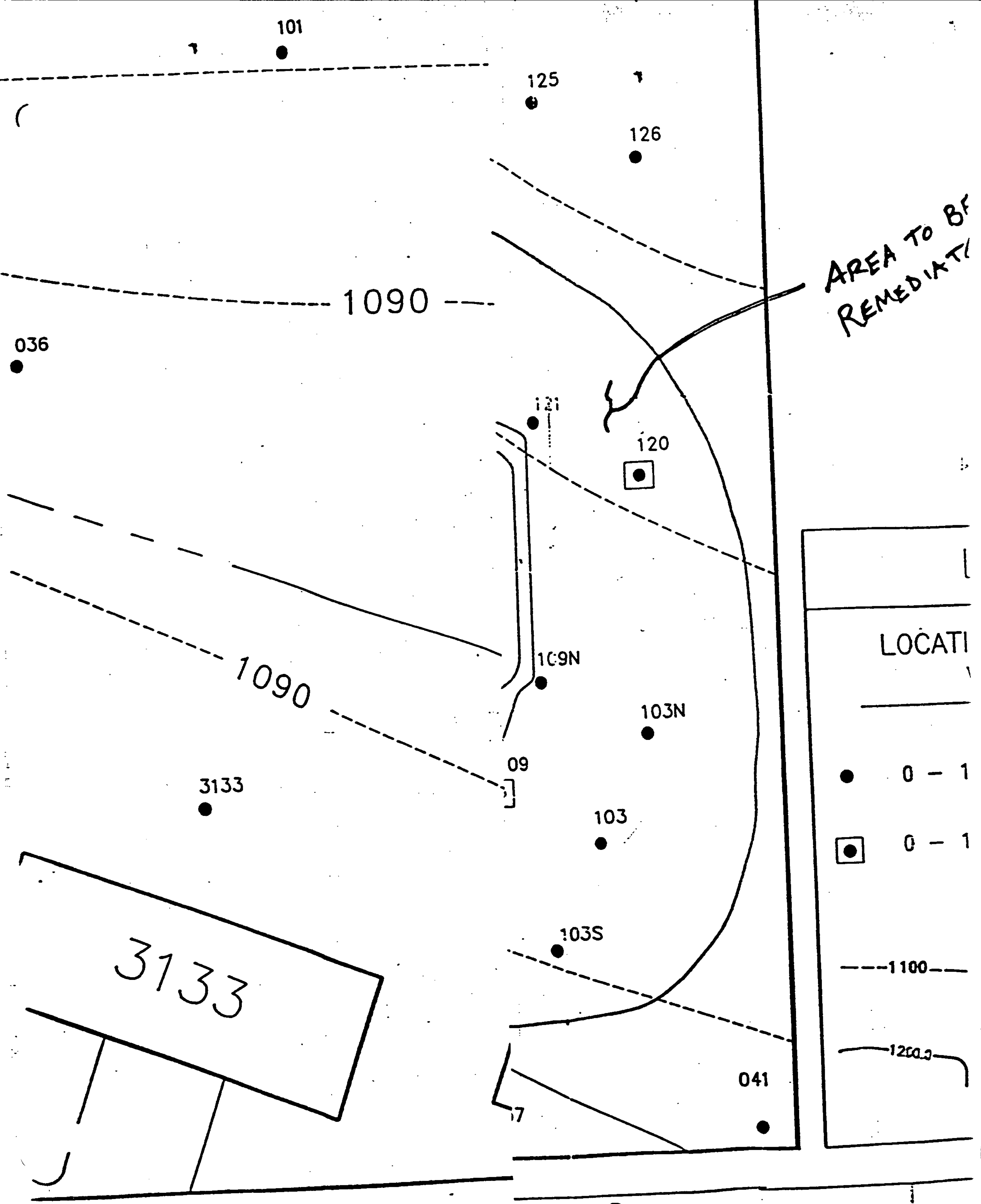


FIGURE 3

PLATE 2 – CONTOURS OF LEA

APPENDIX B

SITE VISIT REPORT

OHM Corporation

December 8, 1993

Department of the Army
Corps of Engineers, Omaha District
Attn: CEMRO-ED-ER/Shields
215 North 17th Street
Omaha, NE 68102-4978

Dear Mr. Shields:

RE: **Site Visit Report - Contract No. DACW45-94-D-0005 Rapid Response: Contaminated Soil Handling at Ft. Riley, Kansas**

On December 1, 1993, OHM Remediation Services Corp. (OHM), performed a site visit per USACE request at the referenced project site. This report provides pertinent details of meetings and the site inspection conducted during the visit.

1.0 Initial Meeting

Attendees:

- James J. O'Neill, USACE, Ft. Crook
- Jim Darnall, OHM
- Paul Lear, OHM
- Phil Connor, OHM
- Joseph Shields, USACE, Omaha District
- Mary Wichman, USACE, Omaha District
- Jim Woolcott, USACE, Omaha District
- Dan Higgins, Ft. Riley
- Kevin Birkett, USACE, Ft. Crook
- Garth Anderson, USACE, Kansas City
- Janet Wade, Ft. Riley
- Katie Watson, Ft. Riley
- Brad Brink, Kansas City

Background information was provided concerning the Pesticide Storage Facility (PSF) and the Colyer Manor Lead Site. It was indicated that the Ellis Heights Chlordane Site would not be a part of the intended project.

The PSF comprises a portion of Building No. 348. The building has been used to store pesticides since about 1973. Contamination at the facility is related to detected levels of Chlordane, DDT, Heptachlor and Dieldrin in soil around the building and outside the fenced boundary. Figure 4-21, Pesticide Contamination of Soil (prepared by Law Environmental, Inc.) summarizes the results of sampling for pesticide contaminants. Also, relevant are Law Environmental drawings Figures 4-7, 4-8, 4-12 and 4-13. It was additionally stated that a single hot spot for arsenic contamination was also detected outside the fence boundary.

The remediation goal for the facility is at the ten to the minus fifth level. It is intended that remediation will consist of excavation and stabilization of approximately 840 yards of soil. The treated soil will be placed in a landfill. Custer Hill Landfill (CHL) at Fort Riley will be considered as a disposal site. CHL has not been used since October of this year; a closure plan has been prepared for the landfill. The effective date for closure of CHL was given as April 9, 1994.

The Colyer Manor Lead Site is adjacent to Fort housing. The site consists of a berm containing soil borrowed from a small arms practice range. The site is located in back of residential buildings. Reference was made to drawing Plate 2 - Contours of Lead Concentrations Behind Building 3135 - Camp Forsyth Area, dated June 1993.

Similar to the planned remediation of the PSF, it is intended to excavate approximately 250 cubic yards, stabilize the excavated soil and place it in a landfill. CHL will be considered as a disposal site.

2.0 Site Inspection of PSF

The portion of Building 348 dedicated to pesticide storage is delineated by a yellow line painted on the building wall. New pavement was placed on the west side of the building about Spring of 1991. The fill line originally located on the west side of the building was moved to the east side of the building at an unknown date. Two 6-inch lifts of clean gravel were placed on the east side of the building during the middle 1980's. Utilities are present underground (gas and water). USACE will reroute these utilities if it is required prior to start of excavation. The existing utility lines may be capped and abandoned with no need to repair. Monitoring wells on the site will be closed by USACE prior to excavation. The wells do not need to be saved.

3.0 Site Inspection of Colyer Hill

Colyer Hill Lead Site work will be conducted with appropriate measures for security and safety of residents in the area, including appropriate dust control measures. Colored tyvek will be worn. Final grading will preserve the existing drainage swale. The site will be reseeded.

4.0 Second Meeting

All attendees of the first meeting reconvened after the site inspections. A list of action items and a schedule for follow-on activities were developed and agreed to as follows:

Action Items:

- As built 348
- Utilities 348/Colyer
- Coordination in DEH Yard
- Garth - Provide RI & Comments
- Provide Custer Hill Landfill map
- OHM owes cost comparison, etc. - Wed 8 Dec
- Manifest Determination (Dan)
- Post Map
- Maps of sites (routes/hospitals)
- Provide health and safety plans
- Closure plan
- POC at Manhatten (lime)
- Identify water source
- Off-limit radio freqs
- Parking at PSF/Colyer
- Staging area for trailers
- Scale house at Custer Hill
- DEH rock for PSF (Bruce McCullum)
- Listed waste issue (PSF)

Schedule:

- 8 December - Site visit report
- 15 December - Scope issued
- 23 December - Treatability
- 7 January - Work plan due
- 14 January - Work Plan Review Meeting
- 28 January - Award contract
- 14 February - Begin work

OHM will prepare and submit with the Site Visit Report, ROM cost estimates for three alternatives:

1. Treatment and disposal on-site at Ft. Riley
2. On-site treatment and off-site disposal
3. Off-site treatment and disposal.

The report and estimates will be faxed to Joe Shields on Wednesday, December 8, 1993.

Documents for information and use were provided by USACE (Janet Wade) to OHM (Phil Connor). These documents are listed in Attachment 1 enclosed.

5.0 Conclusion

OHM is enclosing with this report the Rough-Order-of -Magnitude estimates of alternative approaches. Per your request a copy of the estimates will also be faxed to Janet Wade this date.

OHM appreciates the opportunity to be of service to USACE on this important project. If there are errors or omissions in this report, please contact Jim Darnall at 419/424-4944 or me at 708/963-0005.

Sincerely,

Phillip Connor

Phillip Connor
Project Manager

PC:kc

Enclosures

pc: Jim Darnall, OHM
John Hitchings, OHM
Project File

ATTACHMENT 1

1. USEPA letter to LTC Lynn Munch stamp dated 11/17/93.
2. Federal Facility Agreement issued by USEPA ref. Docket No. VII-90-F-0015.
3. LDR Guide #6A, dated September 1990 (Superfund Publication 9347.3 - 06FS).
4. LDR Guide #6B, dated September 1990 (Superfund Publication 9347.3-06BFS).
5. USEPA Publication: Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (Publication 9360.0-32, dated August 1993).
6. Memorandum dated 19 August 93, Status of Fort Riley Roads in respect to transporting hazardous material.
7. Law Environmental, Inc. drawings Figures 4-7, 4-8, 4-12 and 4-13.
8. Plate 2 - Contours of Lead Concentrations Behind Building 3135, dated June 1993.
9. Detailed site map, Drawing No. 18-02-01, dated December 1985.
10. Fort Riley map (by Higgenbotham and Associates).
11. Topographic map: Fort Riley Military Installation Map DMA Stock No. V778S FTRILEYMIM.
12. USACE drawing, Plate 1 - Location for Medical Facility in relation to PAOC's at Fort Riley Kansas.
13. Ft. Riley Custer Hill Sanitary landfill Closure Plan, dated October 1993.
14. Draft Final, Engineering Evaluation/Cost Analysis dated 16 August 1993 by Fort Riley Directorate of Engineering and Housing, Environmental and Natural Resources Division.
15. Draft, Site Safety and Health Plan for Site Investigation at Fort Riley Kansas, dated 26 April 1993, by Louis Berger and Associates, Inc. (for reference, to be returned to Janet Wade).

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT

FORT CROOK AREA OFFICE

RECORD OF ATTENDANCE

MEETING Site Visit

DATE 12/1/93

Ft Riley

CONTRACT TITLE

CONTRACT NO.

NAME (PLEASE PRINT)	TITLE	COMPANY/ORGANIZATION	(AREA) TELE. NO.
JAMES J. O'NEILL	CIVIL ENG.	USACE, FT. CROOK	(402) 291-4260
JIM DARNALL	DEP. PROG. MGR	OHM, FINDLAY, OH	419/424-4944
[illegible]	MGR TREATABILITY	OHM, FINDLAY, OH	419/423-3526
PHIL CONNOR	PROJ. MGR	OHM, LISLE, IL	708/963-0005
JOSEPH R. SHIELDS	TECH. MGR.	USACE, OMAHA DISTRICT.	(402) 221-7765
Mary Wichman	Chemist	USACE, Omaha District	(402) 221-7755
Jim Woolcott	Ind. Hygienist	USACE, Omaha District	(402) 221-7694
1LT DAN HIGGINS	CIVIL ENG.	FT. RILEY DEH-ENR	(913) 239-8664
KEVIN W BIRKETT	CON. REP	USACE, Ft Crook	(402) 294-3551
Garth Anderson	Tech Mgr	USACE - Kansas City	(816) 426-2845 ext 30
Janet Wade	IRP Mgr	Ft Riley DEH ENR	913 239-3962
Katie Watson	IRP Assist.	Ft Riley DEH-ENR	913-239-3962
Brad Brink	Geologist	COE - Kansas City	816-426-3774

APPENDIX C

BIDDING SCHEDULE
(not used)

APPENDIX D

HEALTH AND SAFETY INSTRUCTIONS

Appendix D - Health and Safety Scope of Work
Soil Excavation, Various Sites, Fort Riley, KS

1. General. The Rapid Response Contractor responsible for the tasks defined by this scope of work shall review all information provided and develop the necessary documents which contain the health and safety criteria, procedures, and practices sufficient to protect on-site personnel, the environment, and potential off-site receptors from the chemical and physical hazards particular to this site. The Contractor shall utilize the services of a Certified Industrial Hygienist (CIH) experienced in hazardous waste site operations to oversee the development and implementation of the health and safety documents required by this section. If the information made available is insufficient to allow the Contractor to develop these documents, a description of all additional information required shall be prepared and submitted to the Contracting Officer (CO).

2. Regulatory Requirements. All site investigation activities and health and safety documents required by this scope of work shall comply with and reflect the following regulations and appropriate guidance publications, as a minimum:

2.1 Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

2.2 U.S. Army Corps of Engineers (USACE), Safety and Health Requirements Manual, EM 385-1-1 (October 1992).

2.3 Occupational Safety and Health Administration (OSHA) Construction Industry Standards, 29 CFR 1926, and General Industry Standards, 29 CFR 1910; especially 29 CFR 1926.65 - "Hazardous Waste Operations and Emergency Response", 29 CFR 1910.1000 - "Air Contaminants".

2.4 NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", October 1985.

2.5 Other applicable Federal, State, and local safety and health requirements.

3. Documents. The following health and safety documents are required to be developed under this scope of work. Avoid providing material of a general nature, not specifically related to this project or site. Information readily available in standard texts should be repeated only to the extent necessary to meet the requirements of this scope. The Safety and Health Program will contain general information required by the referenced OSHA standards and EM 385-1-1 which is applicable to all hazardous waste activity efforts performed by the contractor. The Site Safety and Health Plan should be a brief document addressing only site-specific safety and health requirements and procedures based upon site-specific conditions. Duplication of the general information contained in the Safety and Health Program is unwanted.

3.1 Safety and Health Program. All contractors and their subcontractors performing on-site activities at hazardous waste sites are required by regulation to develop and maintain a written Safety and Health Program in compliance with OSHA standard 29 CFR 1926.65(b)(1) through (b)(4). Written certification that such a program has been prepared and implemented shall be submitted to the CO as a preface to the required Site Safety and Health Plan (SSHP). This program ,including updates, shall be made available to the CO in its entirety upon request. Advanced Agreement # 19 under the Rapid Response Contract has fulfilled this requirement.

3.2 Contractor Site Safety and Health Plan (SSHP). The Site Safety and Health Plan required by 29 CFR 1926.65(b)(4) shall be prepared by the Contractor and submitted to the Contracting Officer for review and approval prior to the commencement of any on-site work activity to be performed by the Contractor and/or his subcontractors. This SSHP shall describe the health and safety procedures, practices, and equipment to be implemented and utilized in order to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed. The level of detail provided in the SSHP shall be tailored to the type of work, complexity of operations to be accomplished, and hazards anticipated. It is anticipated that this project will involve the excavation and off-site treatment/stabilization of soil contaminated with lead and pesticides. All topics required by OSHA standard 1926.65(b)(4), and those described below, shall be addressed in the SSHP. Where the use of a specific topic is not applicable to the project, provide a negative declaration to establish that adequate consideration was given the topic, and give a brief justification for its omission.

3.2.1 Site Description and Contamination Characterization. Describe the location, topography, and approximate size of each site, the on-site jobs/tasks to be performed, and the duration of planned site activities. Compile a complete list of the contaminants found or known to be present in site areas to be impacted by the work to be performed. Compilation of this listing shall be based on results of previous studies, or if not available, select the likely contaminants based on site history and prior site uses/activities. Include chemical names, concentration ranges, media in which found, applicable regulatory clean-up levels, locations on-site, and estimated quantities/volumes to be impacted by site work, if known.

3.2.2 Hazard/Risk Analysis. Identify the chemical, physical, biological, and safety hazards of concern for each site task and/or operation to be performed. Selection of chemicals as indicators of hazard shall be based on media concentrations, toxicity, volatility or potential for air entrainment at hazardous levels, and frequency of detection. Describe chemical and physical properties of selected contaminants, sources and pathways of employee exposures, anticipated on and off-site exposure level potentials, and regulatory (including Federal, State, and local) or recommended protective exposure standards. Specify and justify "action levels" based upon airborne exposure hazards and direct skin contact potentials for upgrades/downgrades in levels of personnel protection; for implementation of engineering and/or work practice controls; for emergency evacuation of on-site personnel; and for the prevention and/or minimization of public exposures to hazards created by site activities. Air monitoring/sampling shall be performed in accordance with Paragraph 3.2.8 : "Exposure Monitoring/Air Sampling Program" below, the resulting data compared with established "action levels", and appropriate corrective actions initiated as necessary.

3.2.3 Accident Prevention. The SSHP will serve as the Accident Prevention Plan (APP) and activity hazard analyses (phase plans), required by F.A.R. Clause 52.236-13, and Paragraphs 01.A.07 through 01.A.08 and Table 1-1 (pp. 3-5) of USACE EM 385-1-1 (1992). The APP shall be contained in the SSHP as a separate definable section, titled "Accident Prevention Plan". Therefore a separate APP is not necessary. The activity hazard analysis is an ongoing process from initiation of plan preparation through the implementation and completion of the field work. This is especially true under the Rapid Response Contracts. Therefore, the activity hazard analysis shall consist of two specific phases, the first of which shall be detailed in the SSHP submittal process to meet the intent of 29 CFR 1926.65 and paragraph 3.2, "Contractor Site Safety and Health Plan" of this section. The phase safety plans shall be outlined and developed to the full extent possible prior to SSHP submittal. Phase two of the activity hazard analysis (phase plans) as required by the APP shall be developed on-site by the Contractor's supervisory staff prior to beginning any specific activity and incorporated into the SSHP on an ongoing basis throughout the duration of the field activities. Any additional topics required by EM 385-1-1, but not specifically covered in Paragraph 3.2. of this scope of work, shall be addressed in the Accident Prevention section of the SSHP under the phase safety field development process. Daily safety and health inspections shall be conducted to determine if operations are being performed in accordance with the SSHP, USACE and OSHA regulations, and contract requirements. In the event of an accident/incident, the Contractor shall immediately notify the CO. Within two (2) working days of any reportable accident, the Contractor shall complete and submit to the CO an Accident Report on ENG Form 3394 in accordance with AR 385-40 and USACE Supplements to that regulation.

3.2.4 Staff Organization, Qualifications, and Responsibilities. Discuss the organizational structure, including lines of authority (chain of command), and overall responsibilities of the contractor and all subcontractors for site activities, including supervisor/employee relationships. Summarize the operational and health and safety responsibilities and qualifications of each key person identified. Specifically: (1) A Certified Industrial Hygienist (CIH) with experience in hazardous waste site operations shall be responsible for the development, implementation, and oversight of the Safety and Health Program and SSHP. The SSHP shall be signed and dated by the CIH prior to submittal; (2) A fully trained and experienced Site Safety and Health Officer (SSHO), responsible to the contractor and the CIH, may be delegated to implement and continually enforce the safety and health program and site-specific plan elements on-site; and (3) At least two persons certified in first aid/CPR by the Red Cross, or equivalent agency, shall be continuously present on-site during site operations.

3.2.5 Training. All personnel performing on-site activities shall have completed applicable training in accordance and compliance with 29 CFR 1926.65(e). In addition, site-specific training covering site hazards, procedures, and all contents of the approved SSHP shall be conducted by the SSHO for on-site employees and visitors prior to commencement of work or entering the site. The type, duration, and dates of all employee training performed shall be listed by employee name and certified in the SSHP.

3.2.6 Personal Protective Equipment (PPE). In accordance with 29 CFR 1926.65(g)(5), a written Personal Protective Equipment (PPE) program which addresses all the elements listed in that regulation, and which complies with respiratory protection program requirements of 29 CFR 1910.134 is to be included in the Safety and Health Program. Therefore, the SSHP shall detail the minimum PPE ensembles (including respirators) and specific materials from which the PPE components are constructed for each site-specific task/operation to be performed, based upon the hazard/risk analysis performed above. When preparing ppe ensembles for protection against highly toxic or mobile chemicals, list any pertinent material breakthrough times, as provided by the ppe manufacturer. Components of levels of protection (A,B,C,D and modifications) must be relevant to site-specific conditions, including heat stress potential and safety hazards. Include site-specific procedures for on-site fit-testing, cleaning, maintenance, inspection, and storage.

3.2.7 Medical Surveillance. All personnel performing on-site activities shall be participants in an ongoing medical surveillance program, meeting the requirements of 29 CFR 1926.65 and ANSI Z-88.2. A description of the general medical surveillance program is to be included in the Safety and Health Program. All medical surveillance protocols and examination results shall be reviewed by a licensed physician who is certified in Occupational Medicine by the American Board of Preventative Medicine, or who, by necessary training and experience, is Board-eligible. The SSHP shall only describe the content and frequencies of any additional medical tests, examinations, and/or consultations determined necessary by the physician due to probable site-specific conditions, potential occupational exposures, and required protective equipment. Certification of participation in the medical surveillance program, the date of last examination, and name of reviewing occupational physician shall also be included for each affected employee. The written medical opinion from the attending physician required by 29 CFR 1926.65(f)(7) shall be made available upon request to the CO for any site employee.

3.2.8 Exposure Monitoring/Air Sampling Program (Personal and Environmental). Where it has been determined that there may be employee exposures to and/or off-site migration potentials of hazardous airborne concentrations of hazardous substances, appropriate direct-reading (real-time) air monitoring and integrated (time-weighted average (TWA)) air sampling shall be conducted in accordance with applicable regulations (OSHA, EPA, State). Both air monitoring and air sampling must accurately represent concentrations of air contaminants encountered on and leaving the site. Sampling and analytical methods following NIOSH (for on-site personnel and site perimeter locations) and/or EPA (for site perimeter or off-site locations) criteria shall be appropriately utilized. Personnel samples shall be analyzed only by laboratories successfully participating in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Testing (PAT) or Laboratory Accreditation programs. Meteorological monitoring shall be performed on-site as needed and used as an adjunct in determining perimeter and any off-site monitoring/sampling locations. Where perimeter monitoring/sampling is not deemed necessary, provide a suitable justification for its exclusion. Noise monitoring and radiation monitoring (alpha, beta, gamma) shall be conducted as needed, depending on the site hazard assessment. All monitoring/sampling results shall be compared to "action levels" established pursuant to Paragraph 3.2.2 : "Hazard/Risk Analysis", above, to determine acceptability and need for corrective action.

3.2.9 Heat and Cold Stress Monitoring. Heat and/or cold stress monitoring protocols shall be implemented, as appropriate. Work/rest schedules shall be determined based upon ambient temperature, humidity, wind speed (wind chill), solar radiation intensity, duration and intensity of work, and protective equipment ensembles. Minimum required physiological monitoring protocols which will affect work schedules shall be developed. In cases where impervious clothing is worn (full-body), the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" protocol for prevention of heat stress shall be followed, and heat stress monitoring shall commence at temperatures of 70 degrees Fahrenheit and above. Where impervious clothing is not worn, the most current published ACGIH heat stress standard (TLV) shall be used. For cold stress monitoring to help prevent frostbite and hypothermia, the most current published ACGIH cold stress standard shall be referenced and followed, as a minimum.

NOTE: If either heat or cold stress is not anticipated due to the season or local climate, provide a negative declaratory statement as mentioned in section 3.2.

3.2.10 Standard Operating Safety Procedures, Engineering Controls and Work Practices. Address the following elements as a minimum: (1) Site rules/prohibitions (buddy system, eat/drink/smoking restrictions, etc.); (2) Material handling procedures (soils, liquids, radioactive materials); (3) Drum/container handling procedures and precautions (opening, sampling, overpacking); (4) Confined space entry procedures; (5) Hot-work, sources of ignition, and electrical safety (ground-fault protection, overhead power line avoidance, etc.); (6) Excavation safety; (7) Machine guarding; (8) Fall protection; (9) Illumination; (10) Sanitation; (11) Engineering controls.

3.2.11 Site Control Measures. Include site map(s) containing work zone delineation and access points. Describe on-site and off-site communications, security (physical and procedural), and general site access.

3.2.12 Personal Hygiene and Decontamination. Specify necessary facilities and their locations. Detail standard operating procedures, frequencies, supplies and materials to accomplish decontamination of site personnel.

3.2.13 Equipment Decontamination. Specify necessary facilities, equipment, and their locations. Detail procedures, frequencies, supplies and materials, and methods to determine adequacy for the decontamination of equipment used on-site.

3.2.14 Emergency Equipment and First Aid Requirements. The following items, as appropriate, shall be immediately av ailable for on-site use:)l(First aid equipment and supplies approved by the consulting MD; (2) Emergency eyewashes/showers (comply with ANSI Z-358.1, 1910.151(c)); (3) Emergency respirators (worst-case appropriate); (4) Spill control materials and equipment; and (5) Fire extinguishers (specify type- i.e., 10 B/C , size, locations).

3.2.15 Emergency Response and Contingency Procedures (On-Site and Off-Site). This section of the SSHP shall contain an Emergency Response Plan in compliance with 29 CFR 1926.65(1), which addresses the following elements, as a minimum: (1) Pre-emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposures, personal injuries, fires/explosions, environmental spills and releases, discovery of radioactive materials; (2) Personnel roles, lines of authority, communications; (3) Posted instructions and a list of emergency contacts: (physician, nearby medical facility, fire and police departments, ambulance service, federal/state/local environmental agencies, CIH, Contracting Officer); (4) Emergency recognition and prevention; (5) Site topography, layout, and prevailing weather conditions; (6) Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control); (7) Specific procedures for decontamination and medical treatment of injured personnel; (8) Route maps to nearest pre-notified medical facility; (9) Criteria for initiating community alert program, contacts, and responsibilities; and (10) Critique of emergency responses and follow-up.

3.3 Logs, Reports and Recordkeeping. The following logs, reports, and records shall be developed, maintained, and submitted to the CO at the conclusion of the site work: (1) Training logs (site-specific, visitor); (2) Daily safety inspection logs (may be part of the Daily QC Reports); (3) Employee/visitor register; (4) Environmental and personal exposure monitoring/sampling results.

4. Document Revisions, Addenda, and Field Modifications. Review comments issued prior to SSHP approval shall be incorporated by revising and reissuing affected pages. If major revisions are necessary, the entire Plan shall be resubmitted for review and approval. Minor changes affecting only a few pages may be made by addenda sheets and resubmitted. Once on-site, unanticipated field conditions encountered which were not addressed in the approved SSHP shall be immediately reported to the CO. Field activities in such areas shall be halted until the SSHP has been modified to reflect changed conditions and reviewed/approved by the CO.

5. <u>CO-Approved Visitors</u>. The Contractor shall continuously maintain on-site a minimum of four (4) sets of protective equipment (except for air-purifying respirators, prescription safety glasses, and safety shoes) for government visitor usage. These ensembles shall include all PPE specified in the SSHP. If protective clothing is included, at least one set shall be size X-large.

6. <u>Special Considerations</u>. (A) All site workers shall receive pre- and post-blood lead monitoring. (B) During intrusive activities at the Pesticide Storage Facility, a minimum of one employee shall be sampled daily for exposure to the identified pesticides known or suspected to be present at this site. If repeated sampling reveals no exposure, then personal sampling may, with the concurrence of the Corps, be decreased or discontinued. Any significant change in field activities, with resultant personnel exposure, shall require the resumption of sampling. (C) Due to public concerns, Level C PPE (Tyvek) worn on the Colyer Manor lead site shall be of an inauspicious color (not white or yellow). (D) Fugitive dust control shall be provided by the use of a water truck, or equivalent.(E) Please be aware that recent Corps policy has declared that the two (minimum) first aid/CPR designated personnel required by EM 385-1-1, 03.A.02, shall be covered by the contractor's Bloodborne Pathogen Standard, 29 CFR 1910.1030. <u>Please address this coverage in the SSHP</u>. Inclusion of the contractor's exposure control plan <u>is not necessary</u>; simply state that the applicable training & offering of HBV vaccine has been completed.

Also note that the governing standard for Hazardous Waste Site Operations, 29 CFR 1910.120, has been transferred to the construction standard, and given the identifier 29 CFR 1926.65. All specific paragraph references retain the same number, thus 1910.120 (b)(1) becomes 1926.65 (b)(1). Reference Federal Register dated June 30, 1993, pg.35076.<u>PLEASE MODIFY YOUR SSHP/WORKPLAN SOFTWARE ACCORDINGLY.</u>

PHASE PLAN GUIDELINES

1. Definition of Phase. A phase is an operation involving a type of work which presents hazards not experienced in previous operations or where new subcontractors are performing the work. The three components, phase-hazard-action, are described in the attached sheets. These include:

a. Phase of Construction. This sample contains a list of phases and subphases that may require a separate phase safety plan. Obviously, all the phases listed will not be applicable to each project and some projects may involve phases not identified in this list.

b. Hazards. This sample contains a list of some of the typical hazards that might be encountered. These are examples only, and should not be copied. It is necessary to study the work involved and to identify the specific hazards that will be experienced at this work area, as the hazards will vary significantly between projects. As an example, hazards encountered on underground utilities at one project may differ substantially from the hazards found at another similar project because of differences in soil, depth of excavation, proximity of structures and building, and locations of other utilities.

c. Sample Phase-Hazard-Action Outline. This sample shows a possible format for a phase safety plan that might be submitted on a representative project. This sample incorporates phases of construction, the hazards that may be encountered, and preventive actions that will be taken to overcome these hazards. This example should not be copied as each phase or project should be analyzed on an individual basis.

2. Individuality. Phase plans developed for one project should not be copied for another as the hazards differ substantially. In addition, there may be a number of alternative ways of dealing with a particular hazard. Accordingly, the phase plan for the project at hand must list only the alternative or combination of alternatives that have been chosen after considering the factors involved.

3. Implementation and Instruction. Employees performing the work must be made aware of the plans. For this reason, an important part of any phase plan is a description of the specific instructions and precautions that will be given to the employees who will be performing the work.

SAMPLE NO. 1

EXAMPLES OF MAJOR/SUBCONSTRUCTION PHASES

Earthmoving, Land Clearing and Building Foundations

- Hand operations
- Equipment operations
- Pile-driving
- Basement excavations

Concrete Work

- Footings
- Forming
- Steel reinforcement
- Concrete placement
- Stripping
- Material Storage
- Finishing

General Building Construction

- Carpentry
- Masonry
- Floor, wall, brick cleaning
- Plastering
- Painting
- Floor coverings
- Roofing
- Misc. finishing phases

Electrical and Instrumentation

- Interior
- Aerial
- Underground
- Alarm and intercom

Demolition

Paving

Explosive and Blasting

Marine Operations

- Floating plant
- Dredging/excavations
- Diving
- Rock placement
- Piled-driving

Trenching and Excavations for Utilities

- Water
- Gas
- Sewer
- Communications cables

Steel Erection

- Delivery and storage
- Erection

Mechanical

- Heating, vent/air cond.
- Plumbing
- Sprinkler systems

Landscaping

- Grading
- Sodding/seeding
- Planting
- Rock placement

Quarrying

Tunneling

Cableway Operations

NOTE: This is not to be considered a complete list of phases of construction. Each project will require its own phase considerations.

SAMPLE NO. 2
EXAMPLES OF HAZARDS TO BE CONTROLLED

Falls

- Into excavations
- Into caissons
- From scaffolds
- From roofs
- From steelwork
- From forms
- From elevated floors
- Through floor openings
- Through wall openings

Cave-ins Caused by:

- Water
- Vibration - traffic, rail, road, and equipment
- Excavated material (spoil)
- Freezing/thawing
- Heavy Equipment
- Adjacent building foundations
- Existing utilities
- Gravel veins

Fire Associated with:

- Welding spatter
- Flammable liquids, vapors, and paints
- Flammable gases
- Improper storage of combustibles

Run Over by Equipment

Collisions Between Equipment

Equipment Rolling Over

Crane Overturning

Contact with Energized Powerlines

Drowning

Material Falling

Crushed Under Equipment

Tire Servicing

Improperly Stacked or Stored Materials

- Round poles
- Steel materials
- Irregularly shaped items

Electrocution or Shock

Health Hazards Associated with Chemicals and Caustics such as:

- Epoxies
- Cement dust
- Acids
- Solvents
- Unknowns

Health Hazards Associated with Toxic Vapors and Mists such as:

- Spray painting operations
- Paint thinners and dryers
- Solvents
- Adhesives
- Carbon monoxide
- Unknowns

Health Hazards Associated with Toxic Particles and Dusts such as:

- Sandblasting
- Masonry saws
- Dry wall taping (asbestos)

Health Hazards Associated with Noise such as:

- Jackhammer operations
- Sandblasting
- Masonry saw operations
- Grinding
- Crushers
- Woodworking equipment

Health Hazards Associated with Ionizing Radiation such as:

- Soil testing
- X-ray of welds

NOTE: This is not to be considered a complete list of hazards. Each project and each phase has its own peculiar hazards that must be controlled.

SAMPLE NO. 3

EXAMPLES OF A PHASE SAFETY PLAN FOR MASONRY CONTRACTORS

Contractor Name: James Masonry

Contract No. 76-0000

Date Prepared: 2 May 1977

Location: Jonesville Army Reserve Center, NE

Equipment to be used: Forklift, mortar mixer, metal tubular scaffold, masonry saw

Phase of Construction	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Ground Level Masonry Activity	Equipment running over employee	(1. Backup alarms. (2. Barricade work areas. (3. Signalmen where required. (4. Brief drivers on proper and safe operations.
	Back injuries due to over-stretching or improper lifting of materials	(1. Stack materials at proper level and height. (2. Set up disposal bins.
	Tripping over materials or stepping on nails, etc.	(1. Clean up materials. (2. Set up disposal bins. (3. brief employees to discard into proper disposal containers.
	Materials being hoisted over employees' heads	(1. Brief crane operator to stay away from area.
Masonry Wall Construction	Employees falling from elevated structures; i.e., scaffold or floor	(1. Deck entire scaffold. (2. Install standard railing and toeboards on all open sides. (3. Install standard ladder and tie off for access. (4. Insure scaffolding is properly assembled. (5. Secure footings for scaffolds.

Sample No. 3 (Cont'd)
EXAMPLES OF A PHASE SAFETY PLAN FOR MASONRY CONTRACTORS

Phase of Construction	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Masonry Wall Construction (Cont'd)	Tripping	(1. Clean up materials. (2. Set up disposal bins. (3. Brief employees to discard into proper disposal containers.
	Back injuries	(1. Stack materials at proper level and height. (2. Brief each employee on how to lift.
Cleanup and Other Masonry Supported Activities	Flying particles from brick saws chipping operations	(1. Safety goggles. (2. Proper guards on saws.
	Electrocution or Shock	(1. Grounded tools.
	Inhaling of toxic materials or handling of caustics or toxic materials	(1. Protective gloves, goggles, chemical masks, aprons, footwear.

NOTE: This is only an example of a phase safety plan and is not to be considered all inclusive. The plan must be developed for <u>each</u> job and <u>each</u> phase.

APPENDIX E

CHEMISTRY INSTRUCTIONS

APPENDIX E
CHEMISTRY
SCOPE OF SERVICES
RAPID RESPONSE ACTION
PESTICIDE STORAGE FACILITY AND COLYER MANOR
FORT RILEY, KANSAS

1 Contractor Sampling and Analysis Plan. This appendix describes the Contractor's responsibilities with respect to the sampling and analysis entailed in this work effort. This shall include any sampling and analytical testing required to determine the extent of the excavation as well as the requirements of the potential disposal facilities and confirmation sampling. The Contractor shall be responsible for the development and implementation (upon USACE approval) of the Contractor Sampling and Analysis Plan (CSAP). The CSAP is intended to be a site specific guidance for the field team for the project required sampling and analysis. The CSAP shall detail all field activities, laboratory activities, and documentation related to the chemical data. A section shall be added to the CSAP to detail the XRF activities at the Colyer housing area. The CSAP shall include a list of equipment to be taken to the field, details of the sampling locations and methodologies including field screening methods to be employed, decontamination procedures, quality control procedures, sample custody and shipments information, analytical methods, and all additional items described within this appendix and other portions of this scope. Number and types of samples and bottle/preservation requirements shall be presented in tabular form. All of the above shall be performed in a manner consistent with the most recent EPA guidelines as outlined in SW-846, the USACE guidance document ER 1110-1-263 Appendix E, and any applicable State of Kansas requirements.

2 Data Quality Objectives. This scope shall identify the types of data and information needed to accomplish the excavation, removal, and disposal of the contaminated soils at the Colyer Manor lead pile and the Pesticide Storage Facility locations.

2.1 Project Objectives.

2.1.1 Colyer Manor Housing Area. The objectives of this field effort are to excavate the contaminated soils in the pile behind the housing area and dispose of any contaminated materials. Investigative sampling was performed in June of 1993. Based on the initial study, the areas of excavation have been generally defined. The Contractor shall incorporate XRF screening or off-site quick turn analysis to assist in complete removal of the contaminated soil. After the material has been excavated; confirmatory samples shall be collected. All sampling shall be performed on a 20 foot grid. For estimating purposes the Contractor shall assume 40 samples for the grid. A portion of the grid samples shall be composited for a disposal sample.

2.1.1.1 Data Required to Meet the Project Objectives. The type of data needed to meet the project objectives shall be generated through soil samples. The analytical methods required to meet the project objective is Total Lead (3050/6010). Investigative and confirmatory samples shall be collected on a twenty foot grid and analyzed by XRF or the Total Lead analysis.

Representative samples shall be collected from the grid shall be composited to determine the disposal requirements. For estimating purposes the Contractor shall assume one (1) disposal sample shall be analyzed for landfill disposal parameters.

2.1.1.2 Clean-Up Objectives. The Interim Guidance on Establishing Soil Lead Clean-up Levels at Superfund Sites (OSWER Directive) sets a level of 500 mg/kg.

2.1.2 Pesticide Storage Facility. The objective of this field effort are to excavate the contaminated soils around the Building 348. Investigative sampling was performed by Law Environmental (Draft RI Report, July, 1993). Based on the initial study, the areas of excavation have been generally defined. The Contractor shall collect 20 investigative samples on a 20 foot grid (plus 5 samples to depth) for analysis by SW-846 Method 8080 to define the pesticide contamination and analyze by method 8080. 10 day turn is acceptable. Extra sample shall be collected at each grid point for a composite sample for the potential disposal facilities. Based on the preliminary sampling results, the Contractor shall excavate, and dispose of the contaminated soils. Confirmation samples shall be collected to verify the removal of contamination is complete on the grid.

2.1.2.1 Arsenic Area. Five (5) samples (plus one to depth) shall be collected for arsenic analysis on a 10 foot diameter from SB-10 for 10 day turn. Based on the results of the investigative study, the Contractor shall excavate the contaminated area and dispose. Two confirmation samples will be collected to assure that the contamination has been removed.

2.1.2.2 Data Required to Meet the Project Objectives. The type of data needed to meet the project objectives shall be generated through soil samples. The analytical methods required to meet the project objectives are Pesticides (3050/8080), PAHs (3050/8100), and Arsenic (3050/6010), as appropriate. Confirmatory samples shall be collected on a twenty foot grid and analyzed for pesticides and PAHs. Two samples shall be collected from the area where the arsenic contaminated soils were removed and analyzed for arsenic. Extra sample shall be collected at each grid for a composite for the potential disposal facilities.

2.1.2.3 Clean-Up Objectives. The Action Memorandum provided by Fort Riley provides action levels for various contaminants. These levels shall be used for the clean-up criteria at this site.

Chlordane	0.17 ppm
DDT	0.66 ppm
Dieldrin	0.014 ppm
Heptachlor	0.050 ppm
Arsenic	to background

The PAHs are likely due to the asphalt in the area. The data will be for informational purposes only, therefore a clean-up criteria is not appropriate.

2.2 Background Sampling. At the request of Fort Riley, the Contractor shall also collect 20 samples from locations specified by the Kansas City

District geologist for arsenic, beryllium, thallium, and nitrate. This information is requested to establish background levels for this naturally occurring analytes.

3 <u>Field Activities</u>. The following are the field activities to be performed as part of this investigation.

3.1 <u>Colyer Manor</u>. At the residential areas, the Contractor shall screen samples to quickly determine the levels of lead. This may be accomplished by XRF screening or by an ICP screen to assist in removal of all material above 500 ppm. Verification samples from the site shall be sent to an off-site laboratory for analysis.

3.2 <u>Pesticide Disposal Facility</u>. Field screening kits are not available to achieve the detection limits needed for this site. The Contractor will have to rely on the data generated in the Draft RI Report and the investigative sampling effort.

3.3 <u>Disposal Sampling</u>.

3.3.1 <u>Soil Disposal Samples</u>. Disposal samples shall be collected from the contaminated soil and analyzed for disposal parameters. QA samples will not be required for these samples because the acceptance of the disposal facility validates the data.

3.3.2 <u>Liquid Disposal Sample</u>. All liquids generated during decontamination procedures shall be collected and disposed of in accordance with all applicable State of Kansas and Federal regulations. It is anticipated that the liquids can be applied to the solid waste stream and disposed.

3.3.3 <u>Disposal of PPE</u>. The Contractor shall investigate the disposal options for the PPE generated during this work effort. The Contractor shall investigate all applicable Federal and State of Kansas regulations and outline the appropriate disposal options in the CSAP.

3.4 <u>Backfill and Source Water Sampling</u>. These samples shall be collected only if the source material has not been verified clean. One sample shall be collected from each source material and analyzed for volatiles (8260), semi-volatiles (8270), pesticides (8080), and Metals (6010).

4 <u>Sample Preparation and Packaging</u>. All sampling methods, sampling equipment, sample bottles, preservatives, and decontamination procedures to be used shall be detailed in the CSAP. All of the above shall be performed in a manner consistent with the most recent EPA guidelines as outlined in SW-846, July 1992 revision, and the USACE guidance document ER 1110-1-263 appendix E, dated 1 October 1990. The CSAP shall be subject to USACE approval. All sample volumes must meet or exceed all analytical requirements of the contract laboratory. The anticipated analytical parameters are discussed in Section 5.

4.1 <u>Details of Sampling and Preservation Procedures</u>. The composition and volume of sample containers shall be specified along with a description of their preparation and cleaning, the USACE requires the use of EPA certified clean bottles. Non-disposable sampling equipment directly contacting the sample shall be stainless steel or Teflon. The CSAP shall describe the cleaning of equipment and precautions for prevention of sample cross contamination during collection. Compositing and homogenizing procedures shall be included where appropriate. Sample containers, volumes, preservatives and holding times shall be presented in tabular form in the CSAP.

4.2 Sample Handling, Preservatives, and Holding Times. The soil samples are to be placed in appropriately labelled sample containers, preservatives added (if required), enclosed within a plastic zip-lock bag, and placed in a chilled cooler. Once the samples for the day are acquired, the required paperwork shall be completed, the cooler packed with fresh coolant (if required) and packing material (bubble wrap works well), and the samples shall be shipped or delivered to the designated laboratory. Sample packaging, shipping, and chain-of-custody shall follow all applicable USEPA and USACE guidelines, and shall be detailed in the CSAP. USACE guidelines are outlined in the document Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Waste, (ER 1110-1-263, Appendix E, 1 October 1990). Soil samples taken for this project shall be considered low level/environmental samples for packaging and shipping purposes. No sample shall be held on site for more than twenty-four (24) hours. The Contractor shall provide specific details of these items in the CSAP.

4.3 Decontamination Procedures.

4.3.1 Sampling Equipment. All sampling equipment shall be disposable, stainless steel, or teflon and shall undergo decontamination procedures as follows (except disposable):

4.3.1.1 Non-phosphate laboratory detergent wash and brushing to remove large particles;

4.3.1.2 A tap water rinse;

4.3.1.3 A nitric acid (for metals) or isopropanol (for pesticides) rinse;

4.3.1.4 A thorough double deionized water rinse.

4.3.2 Equipment. All heavy equipment shall be steam cleaned prior to removal from the site.

4.3.3 Disposal of Liquids. All liquids generated during decontamination procedures shall be collected and disposed of in accordance with all applicable State of Kansas and Federal regulations. It is anticipated that this liquid may be disposed of with the solid waste stream. The Contractor shall outline the disposal method for this waste stream in the CSAP.

4.4 Sample Container/Cooler. The Contractor shall furnish all materials and equipment necessary to obtain and deliver all field samples. This includes, but is not limited to, all sample bottles, preservatives, zip-lock bags, ice bags (or blue ice), coolers and any paperwork forms necessary.

4.5 Sample Labels. Correct sample labeling and the corresponding notation of the sample identification numbers in the field logbook are necessary to prevent misidentification of samples and their eventual results. All sample labels shall be filled out legibly with indelible ink (preferably waterproof), affixed to the sample bottle, and covered with clear tape. These labels are to include the following at a minimum:

4.5.1 Name/initials of the collector;

4.5.2 Date and time of collection;

4.5.3 Place of collection;

4.5.4 Sample ID number (must uniquely identify each sample, for example, RI-L-01 which identifies the project -RI, the station location L- Lead Site, P- Pesticide etc., and the sample number);

4.5.5 Analysis required;

4.5.6 Preservatives added;

4.5.7 Designation between "grab" and "composite" samples.

4.6 Chain-of-Custody/Sample Shipment. Chain-of-Custody shall be maintained for all samples collected during this project. It is very important that the information on the Chain-of-Custody form match the information on the sample bottles. Chain-of-Custody forms shall be completed for every cooler, and shall be sealed in a zip-lock bag and taped to the inside of the lid of the cooler. A minimum of four custody seals shall be placed on the outside of the cooler. Chain-of-Custody procedures shall be in accordance with USACE Sample Handling Protocol and USEPA procedures. All samples shall be sent via overnight delivery or hand delivered to the receiving laboratory. The Contractor shall define, in the CSAP, the name, address, telephone number, and a POC at the laboratory which will be utilized for the analysis of the samples. The receiving laboratory shall be notified by the Contractor approximately 1 week prior to the arrival of the first sample shipment and at least twenty-four (24) hours notice given for Saturday delivery.

5 Analytical. An appropriate analytical protocol shall be proposed by the Contractor for the samples. The following matrix-specific analytical methods are anticipated for the samples taken from the previously described areas. The methods to be used, along with appropriate digestion/extraction methods, must be specified in the CSAP unless otherwise approved by the Corps of Engineers. These methods must be EPA-approved and consistent with any applicable current State of Kansas requirements. These methods must be followed explicitly including all quality control procedures detailed in the respective methods unless otherwise authorized by the Corps of Engineers.

5.1 Disposal Soil Samples. The Contractor shall investigate the requirements of the disposal facility. It is anticipated that the standard landfill disposal package will be necessary. The Contractor shall address the required disposal parameters for the designated disposal facility in the CSAP for USACE approval.

6 Method Detection Limits. Detection limits for the analyses shall be according to applicable EPA methodologies or Standard Methods unless otherwise stated. For this work effort the detection limits for the contaminants of concern shall be 2 to 5 times below the action levels stated in Section 2. **The contractor shall notify the laboratory of this requirement prior to the shipment of samples.** Detection limits shall be summarized in the CSAP. Data reports shall also list specific detection limits for constituents analyzed.

7 Calibration Procedures/Frequency. Calibration of the analytical instrumentation to be used for this project is to be outlined in the CSAP. Calibration requirements and the frequency associated with them shall be in accordance with the individual methods.

7.1 XRF Screening (if used). The Contractor shall provide a qualified individual who is experienced in the calibration and operation of the XRF to perform the analysis. The CSAP shall devote a section to a detailed discussion of the field XRF screening required for this project. The Contractor shall thoroughly detail all assumptions used in extrapolating the screening data to the action levels. During all XRF measurements performed by the Contractor for this project the Contractor shall record intensities as well as results. Initially, the Contractor shall send 5 to 10 calibration samples to a laboratory for analysis. All samples shall be prepared on-site prior to being sent to the laboratory. A portion of the sample shall be used for the XRF analysis, and a portion shall be sent to the off-site laboratory for quick-turn analysis (a local laboratory is acceptable). The on-site chemists shall keep a record of all samples and a comparison of the laboratory results to the XRF results. The continuing calibration check shall be performed utilizing the calibration samples and from the confirmation sample results.

7.1.1 Confirmation Screening. During the actual excavation of the area, the Contractor shall screen post excavation samples to verify the preliminary delineation and removal of contaminants. If action levels are not met, the excavation shall continue as directed by the USACE on-site Representative. If the screening indicates that action levels have been met, the sample shall be retained as a verification sample and submitted to the off-site laboratory as described below.

7.2 Off-site Screening (if used). Samples shall be sent to an off-site laboratory or hand delivered to a local laboratory for a quick turn ICP screen for lead. These samples will be collected on a twenty foot grid to assist in delineation of the contaminated area.

7.3 Off-site Confirmation Analysis. The Contractor shall collect samples for Total Lead analysis on a 20 foot grid. The laboratory verification samples will include the splits and duplicates as required by the SW-846 methodology.

8 Laboratory Quality Control. The Contractor shall perform the quality control procedures as described in the reference methods. This includes reagent blanks, laboratory replicates, matrix spikes and duplicates, and surrogate standards. If acceptable windows (as outlined in SW-846 for matrix spike/surrogate recoveries are not met in the first analytical run, the laboratory shall be responsible to rerun the sample to prove matrix affects at no expense to the government. The Contractor shall summarize windows of acceptability for spikes/surrogates and actions to be taken in the event of out-of-control situations in the CSAP. The CSAP shall describe in detail the laboratory QC procedures including specific compounds and their performance criteria.

9 Laboratory Turn Around Time. The Contractor shall require no longer than a 30 day turn around time (from receipt of samples) for the analytical results from the laboratory. To avoid down-time at the site, quick turn-around-time is required for the confirmatory soil samples while excavating. Any quick turn-around-times used shall be proposed with justification in the CSAP.

10 USACE Chemical Quality Data Management. USACE requires that Quality Control (QC) and Quality Assurance (QA) samples be collected and analyzed by the contract laboratory and the USACE QA laboratory, respectively. These QC and QA samples include splits or replicates of confirmation soil samples only. QC samples help the Contractor and the contract laboratory to identify and diagnose problems related to sampling and analysis.

10.1 QA Samples. QA samples shall be sent to a USACE QA laboratory by overnight delivery for government monitoring of sampling and contract laboratory performance. The Government (USACE) QA laboratory designated for this project is:

U.S. Army Corps of Engineers
Missouri River Division (MRD) Laboratory
ATTN: CEMRD-EP-LC (Sample Custodian)
420 South 18th Street
Omaha, NE 68102
Telephone: (402) 444-4314

The Contractor shall notify the QA Laboratory one (1) week prior to the first delivery of samples and at least 24 hours notice given for Saturday sample deliveries. (NOTE: All Saturday deliveries shall be scheduled to arrive at the MRD Laboratory prior to noon unless special arrangements can be made in advance with the MRD Lab.) The QA Laboratory shall also be notified when the final shipment of samples has been sent at the completion of sampling activities.

10.2 MRD Project Identification for QA Samples. The Contractor shall be responsible for adding the Project ID "MRD LIMS #2415" to the labels and chain-of-custody records for all QA samples shipped to the MRD Laboratory throughout the duration of this project.

10.3 Quality Assurance Review. If, at any time throughout the duration of this project, it can be demonstrated that chemical quality control contract requirements were not met, the COR will direct the Contractor to take appropriate corrective action(s). This may include direction requiring that samples be re-analyzed and/or re-collected at the expense of the Contractor. The following procedures will be performed by the USACE during the ongoing USACE Quality Assurance review process:

10.3.1 Inspection of QA Samples. The QA laboratory will inspect QA samples to insure that sampling and shipping procedures correspond to Chemical Data Acquisition with regard to sample containers, preservation, labeling, chain of custody, etc.

10.3.2 Evaluation of Deliverable. The USACE will evaluate Contractor's deliverables specified for the acquisition of data (discussed below).

10.3.3 Data Comparison. The USACE will analyze all QA samples and then compare analytical results obtained by contract laboratory with those obtained by the USACE QA laboratory from split or replicate samples.

10.4 Data Report to the Quality Assurance Laboratory. The Contractor's data for the soil samples must be submitted to the Missouri River Division Laboratory and the Omaha District for data evaluation and QA/QC comparison within 30 days of receipt of the samples. USEPA SW-846 data report forms are acceptable for Corps of Engineer projects. This report package shall be submitted separately and shall include all sample and internal quality control results such as method blanks, spike and surrogate recoveries, and replicate analyses which shall meet or exceed the HTW minimum data reporting requirements. The following are minimum data reporting requirements:

10.4.1 Sample Identification. The Contractor shall prepare a tabular presentation which matches contract laboratory sample identifications to QA laboratory sample identification. This table shall identify all Field Duplicates and Field Blanks as such and match with their corresponding field samples where applicable.

10.4.2 Sample Receipt. The contract laboratory shall complete and report a "Cooler Receipt Form" for all shipments for purposes of noting problems in sample packaging, chain-of-custody, and sample preservation. An example form is available from the Missouri River Division Laboratory.

10.4.3 General Organic And Inorganic Reporting. For each analytical method run, the Contractor shall report all analytes for each sample as a detected concentration or as less than the specific limits of quantitation. Each analytical method run shall be clearly identified as belonging to a specific analytical batch. Generally, all samples with out-of-control spike recoveries being flagged for matrix interferences shall be designated as such. Appropriate data flags such as CLP shall be used. All soil samples shall be reported on a dry-weight basis with percent moisture also reported unless otherwise approved. The Contractor shall also report dilution factors for each sample as well as the date of extraction (if applicable) and date of analysis.

10.4.4 Internal Quality Control Reporting. A complete set of Quality Control results shall be reported for each analytical batch even if some of the QC was not performed on samples from this Corps of Engineers project. The QC results shall include but not limited to laboratory blanks, surrogate and matrix spike recoveries, laboratory duplicates and/or matrix spike duplicate pairs. At a minimum, internal quality control samples shall be analyzed at rates specified in the specific methods or higher rates if required to meet project specific objectives.

11 QA/QC Problems. All QA/QC problems in the field or in the laboratory shall be reported immediately to the USACE on-site Construction Representative and to the USACE Project Chemist within twenty-four (24) hours.

12 Data Assessment and Evaluation. Data assessment and evaluation for this project shall be performed by the Contractor. A plan for this activity shall be proposed in the required CSAP. Data, including all quality control information, are to be reported on forms as presented in SW-846 (third edition). Raw data are not required in the report package. Results for soil samples shall be reported on a dry weight basis.

APPENDIX F

SUBMITTAL REGISTER

SUBMITTAL REGISTER
PESTICIDE STORAGE FACILITY AND COYLER MANOR SITE, FORT RILEY, KANSAS
EXCAVATION AND DISPOSAL OF PESTICIDE AND LEAD CONTAMINATED SOILS

All Documents Overnight Mail unless Otherwise Noted

Name/Address	Draft Project Work Plans	Final Project Work Plans	Draft Cost Proposal	Final Cost Proposal	Verbal Covers. Record	Weekly Status Report	Daily Submit.	Draft Project Report	Final Project Report	HWM, LRDN, WPS
U.S. Army Corps of Engineers ATTN: CEMRO-ED-ER (Shields) 215 N 17th Street Omaha, Nebraska 68102-4978 (402) 221-7765; FAX: ext. 7793	5	5	0	0	1	1	0	5	5	0
U.S. Army Corps of Engineers ATTN: CEMRO-CD-FC (Schmidt) Building 527 Fairchild Hall - 3rd Floor Offutt AFB, NE 68113 (402) 291-4260; FAX: ext. 8177	1	2	0	0	1	1	2	1	1	1
U.S. Army Corps of Engineers ATTN: CEMRO-CT-C (Daubman) 215 N 17th Street Omaha, Nebraska 68102-4978 (402) 221-4113	0	0	7	7	0	0	0	0	0	0
U. S. Army Corps of Engineers ATTN: CEMRO-ED-EH (Bev Graham) 215 N 17th Street Omaha, Nebraska 68102-4978 (402) 221-7687	0	0	0	0	0	0	0	0	0	1
U.S. Army Corps of Engineers ATTN: CEMRK-ED-TP (Anderson) 601 East 12th Street Kansas City, Missouri 64106-2896 (816) 426-2845, ext. 3070	1	1	0	0	0	1	0	1	1	0

SUBMITTAL REGISTER (Con't)
PESTICIDE STORAGE FACILITY AND COYLER MANOR SITE, FORT RILEY, KANSAS
EXCAVATION AND DISPOSAL OF PESTICIDE AND LEAD CONTAMINATED SOILS

All Documents Overnight Mail unless Otherwise Noted

Name/Address	Draft Project Work Plans	Final Project Work Plans	Draft Cost Proposal	Final Cost Proposal	Verbal Covers. Record	Weekly Status Report	Daily Submit.	Draft Project Report	Final Project Report	HWM,WPS, LDRNC,
Directorate of Eng & Housing ATTN: AFZN-DE-V (Wade) Building 1970 Fort Riley, KS 66442-6000 (913) 239-3962	6	10	0	0	0	2	0	6	10	1
U.S. EPA, Region VII SF Branch, Waste Manag.Div. ATTN: Scott Marquess 726 Minnesota Avenue Kansas City, Kansas 66442-6000 (913) 551-7131	2	2	0	0	0	1	0	0	2	0
Kansas Dept. of Hlth. & Envrn. Bureau of Envrn. Remediation ATTN: Randy Brown Forbes Field, Building 740 Topeka, Kansas 66620-0001 (913) 296-8065	2	2	0	0	0	1	0	0	2	0

APPENDIX G

LABOR AND WAGE RATES

TO: Joe Shields #________ LOC: Ft. Riley, KS

Goals for minority participation for each trade	Goals for female participation in each trade
6.5	6.9

Covered Area: Topeka, KS, EA- 141, Riley Co. a part

General Decision Number KS930027

Superseded General Decision No.

State: Kansas

Construction Type:
Heavy
Sewer and Water Line

County(ies):

GEARY	RILEY

HEAVY, SEWER AND WATER LINE CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	08/06/1993

COUNTY(ies):
GEARY RILEY

SUKS2002A 01/19/1990

	Rates	Fringes
BRICKLAYERS	15.89	
CARPENTERS	10.06	1.80
CEMENT MASONS	8.93	
ELECTRICIANS	14.24	1.25
FORM SETTERS	7.10	
LABORERS:		
Laborers	6.23	1.52
Pipelayers	5.83	
Rebar workers	11.18	
PIPEFITTERS	16.74	
PLUMBERS	17.65	1.98
POWER EQUIPMENT OPERATORS:		
Backhoe	7.59	
Bulldozer	6.50	
Crane	8.55	
Grader	7.47	
Loader	7.70	
TRUCK DRIVERS	5.94	

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

END OF GENERAL DECISION

APPENDIX H

SALES AND USE TAX

CEMRO-OC/Viles/ch/3820

10 January 1994

MEMORANDUM FOR CEMRO-ED-ER (ATTN: Joseph R. Shields)

SUBJECT: Rapid Response, Kansas Sales and Use Tax

1. Please refer to your memorandum dated 4 January 1994 regarding a Rapid Response Project at Fort Riley, Kansas.

2. According to Kansas Statutes, the state sales and use tax rate is 4.9%. Each locality may impose local county or city rates which may increase the total rate. The contractor should check with the local tax authority to inquire about the rate.

3. Kansas Statute Annotated §79-3606(e), provides that all tangible personal property or services purchased by a contractor for the erection, repair or enlargement of buildings or other projects for the government of the United States are exempt if such property or services would also be exempt from taxation if purchased directly by the government. The government must obtain an exemption certificate from Kansas and furnish such to the contractor. Upon completion of the project, the contractor must furnish a sworn statement on a form provided by the director of taxation, attesting to the fact that all purchases were entitled to an exemption. Additionally, all invoices must be held by the contractor for a period of five (5) years.

4. Enclosed is a copy of the form to be used to request an exemption certificate. If you have questions or need further information, please contact Jenny Jones at the Kansas Department of Revenue, Division of Taxation, at (913) 296-3498. She has mailed a number of these request forms to our office. Upon receipt, we will forward them to your division.

ANN L. WRIGHT
Senior Assistant District Counsel

Encl

REQUEST FOR PROJECT EXEMPTION CERTIFICATE

Date ______________________

Kansas Department of Revenue
Division of Taxation
Business Tax Bureau
Robert B. Docking State Office Building
Topeka, Kansas 66625-0001
(913) 296-2461

It is requested that a Certificate of Exemption be issued to the Petitioning Authority for the following described project if it is determined by the Department of Revenue that the proposed project qualifies for exemption from sales tax under the provisions of K.S.A. 79-3606(d) or (e).

(A) Type of Project: ______________________
Describe Work to be Done

A. Present Use of Facility: ______________________

B. Proposed Use of Facility After Project: ______________________

(B) Project Location: ______________________
Building Number, Street Address, City, State

(C) Is this project being constructed as part of a business enterprise whose sales are subject to sales tax (e.g., municipal water, electric or gas companies)? Yes ☐ No ☐

(D) Is the Petitioning Authority authorized to levy ad valorem taxes on tangible property? Yes ☐ No ☐

If so, under what statute? ______________________

(E) A. Is this project being totally financed by industrial revenue bonds? Yes ☐ No ☐

B. Is this project being partially financed by industrial revenue bonds? Yes ☐ No ☐

Amount of bonds being issued for project: ______________________

If yes, A or B above, you must have the agreement on the back of this form completed and attach a copy of the letter of intent or resolution of intent to issue bonds.

If no, how is project being financed (show type of tax, bonds, etc.)? ______________________

____

(F) Name of Claimant Owner of Project: ______________________

(G) Estimated Project Cost: ______________________

(H) Contract Date: ______________________

(I) Contract No. ______________________

(J) Project No. ______________________

(K) Starting Date: ______________________

(L) List Names and Addresses of Prime Contractors Below:

____
Petitioning Authority

____
Signature of Authorized Representative

____
Type or Print Name

____
Mailing Address

____
City, State & Zip Code

____
Title Phone Number

STD-76 (Rev. 2/93)

This agreement is made and entered into between and by the ______________________________ (name of political subdivision), hereinafter referred to as Exempt Entity; and ______________________________ (name of beneficiary of industrial revenue bond proceeds), hereinafter referred to as Beneficiary.

It is hereby agreed by all parties to this agreement that the construction project for which the request for an exemption certificate is being made would be exempt from sales tax solely due to the fact that it is being financed by industrial revenue bonds. It shall be the duty of the Exempt Entity to notify the Department of Revenue when the industrial revenue bonds have actually been issued.

Whereas, the Department of Revenue deems it necessary to insure that sales or compensating tax is paid should the project not be financed by industrial revenue bonds, it is hereby further agreed by the Beneficiary that if the industrial revenue bonds have not been issued by the time the project is completed then the Beneficiary will remit to the Department of Revenue the sales or compensating tax, and applicable interest on tax, which is due based upon the cost of tangible personal property or services used or consumed in the construction of the project. It is agreed, that the Secretary of Revenue shall determine when the project has been completed.

The Director of Taxation shall have the right to demand from the Beneficiary payment of the sales and compensating tax and applicable interest due the State should the Department of Revenue not receive such payment within thirty (30) days after the project has been completed.

Any and all notices required herein shall be mailed and addressed as follows:

A. Notices to the Department of Revenue shall be addressed to: Chief, Business Tax Bureau, Kansas Department of Revenue, Robert B. Docking State Office Building, Topeka, Kansas 66625-0001;

B. Notices to the Exempt Entity shall be addressed to: ______________________________ ______________________________;

C. Notices to the Beneficiary shall be addressed to: ______________________________ ______________________________.

This agreement shall be binding upon all parties hereto and any and all their successors.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by persons authorized to do so lawfully and with full corporate authority.

POLITICAL SUBDIVISION

____
Authorized Signature

____
Type or Print Name and Title

DATED: ______________________________

BENEFICIARY OF INDUSTRIAL REVENUE BOND PROCEEDS

____
Authorized Signature

____
Type or Print Name and Title

DATED: ______________________________

APPENDIX I

PROJECT FORMS

RAPID RESPONSE QUALITY CONTROL DAILY REPORT

____
(CONTRACTOR'S NAME)

____
(CONTRACT NUMBER)

____
(SITE NAME AND LOCATION)

REPORT NO.____ DELIVERY ORDER NO.________________ DATE__________
WEATHER_________ RAINFALL______INCHES TEMP: MIN.______ MAX.______

INSTRUCTIONS: THE CONTRACTOR SHALL SUBMIT THIS FORM DAILY AT THE CLOSE OF BUSINESS TO THE ON-SITE CORPS REPRESENTATIVE. CONCURRENTLY, THE CONTRACTOR SHALL PROVIDE ELECTRONIC ACCESS TO THE COMPLETED FORMS TO THE CORPS DISTRICT OFFICE AND THE AREA OFFICE.

1. WORK PERFORMED TODAY BY PRIMARY CONTRACTOR ON-SITE AND/OR OFF-SITE (INCLUDING A COMPLETE DESCRIPTION):_______________________

2. WORK PERFORMED BY SUBCONTRACTORS ON-SITE AND/OR OFF-SITE (INCLUDE A COMPLETE DESCRIPTION):

3. COMPLETE AND ATTACH THE DAILY PERSONNEL COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 1.

THE DAILY PERSONNEL COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, EMPLOYEE NAME AND CLASSIFICATION, HOURLY LABOR RATES (REGULAR, OVERTIME OR OTHER), TOTAL HOURS (REGULAR, OVERTIME OR OTHER) AND PER DIEM. LABOR COSTS SHALL BE SUMMED FOR: EACH EMPLOYEE, THE ENTIRE DAILY REPORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF LABOR.

4. ON-SITE CONDITIONS WHICH RESULTED IN DELAYED PROGRESS:

5. TYPE AND RESULTS ON INSPECTIONS: (INDICATE WHETHER: P-PREPARATORY, I-INITIAL, OR F-FOLLOWUP AND INCLUDE SATISFACTORY WORK COMPLETED OR DEFICIENCIES WITH ACTION TO BE TAKEN):

6. LIST TYPE AND LOCATION OF TESTS PERFORMED AND RESULTS:

7. LIST VERBAL INSTRUCTIONS RECEIVED FROM GOVERNMENT PERSONNEL ON ANY DEFICIENCIES OR RETESTING REQUIRED:

8. COMPLETE AND ATTACH THE DAILY EQUIPMENT COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 2. THE DAILY EQUIPMENT COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, EQUIPMENT TYPE AND IDENTIFICATION NUMBER, HOURS IN SERVICE, HOURS STANDBY, HOURS IDLE TIME, COST RATE, AND DAYS IN SERVICE. EQUIPMENT COSTS SHALL BE SUMMED FOR: EACH TYPE, THE ENTIRE DAILY EFFORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF EQUIPMENT.

9. LIST THE TOTAL NUMBER OF SAMPLES COLLECTED AND TESTED FOR THE DAY:
COLLECTED:_______ TESTED:_______ AMPLIFYING INFO.________________
____
____
____
____
____

10. LIST THE TOTAL QUANTITY OF WASTEWATER TREATED: __________ GALLON(S)

11. LIST THE TOTAL NUMBER OF DRUMS OVERPACKED:

QUANTITY	LOCATION	HAZ-CAT

12. LIST THE TOTAL AMOUNT OF WASTE(S) REMOVED FROM THE SITE:

LIQUID: ______BBL/GAL SOLIDS: ______YDS/TONS

AMPLIFYING INFO:________________________________
____
____
____

13. LIST THE FOLLOWING TRANSPORTATION AND/OR DISPOSAL INFORMATION:

QUANTITY	I.D. NO.	MATERIAL	MANIFEST NO.	DISPOSAL LOCATION

14. COMPLETE AND ATTACH THE DAILY MATERIAL COST REPORT AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 3. THE DAILY MATERIAL COST REPORT IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND OFF-SITE INCLUDING SUBCONTRACTORS. AT A MINIMUM, THE COST REPORT SHALL PROVIDE: REPORT TITLE, SITE NAME, CONTRACTOR, CONTRACT NUMBER, DELIVERY ORDER NUMBER, DATE, MATERIAL PURCHASED, QUANTITY AND UNITS, LOCATION OF MATERIAL, AND VENDOR. MATERIAL COSTS SHALL BE SUMMED FOR: EACH PURCHASE, THE ENTIRE DAILY EFFORT, THE ENTIRE DELIVERY ORDER (UP TO THE DATE OF THE REPORT) AND THE PERCENTAGE OF THE ESTIMATED COST OF MATERIALS.

15. LIST ALL SAFETY VIOLATIONS OBSERVED AND CORRECTIVE ACTIONS:

16. LIST ANY CREDITS AND/OR ADJUSTMENTS DUE TO THE GOVERNMENT (REFERENCE INVOICE NUMBER, CONVERSATIONS, ETC.).

17. COMPLETE AND ATTACH THE RAPID RESPONSE DAILY WORK ORDER AT THE END OF THIS DOCUMENT AND LABEL AS APPENDIX 4. THE DAILY WORK ORDER IS REQUIRED FOR ALL COST REIMBURSABLE WORK ON-SITE AND/OR OFF-SITE INCLUDING SUBCONTRACTORS. <u>THIS DOCUMENT DETAILS THE CONTRACTORS NEXT DAY WORK EFFORT WHICH SHALL HAVE ADVANCE APPROVAL BY THE ON-SITE CORPS REPRESENTATIVE BEFORE THE CONTRACTOR IS ENTITLED TO COST REIMBURSEMENT.</u>

18. ADDITIONAL COMMENTS/REMARKS:____________________

19. CERTIFICATION: I CERTIFY THAT THE ABOVE REPORT IS COMPLETE AND CORRECT AND THAT I, OR MY AUTHORIZED REPRESENTATIVE, HAVE INSPECTED ALL WORK PERFORMED THIS DAY BY THE PRIMARY CONTRACTOR AND EACH SUBCONTRACTOR AND HAVE DETERMINED THAT ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP ARE IN STRICT COMPLIANCE WITH THE PLANS AND SPECIFICATIONS, EXCEPT AS NOTED ABOVE.

____

CONTRACTORS DESIGNATED
QUALITY CONTROL REPRESENTATIVE

RAPID RESPONSE DAILY WORK ORDER

____
(PRIMARY CONTRACTOR'S NAME)

____
(CONTRACT NUMBER)

____
(SITE NAME AND LOCATION)

REPORT NO.____ DELIVERY ORDER NO.________________ DATE____________

SUBCONTRACTOR(S): ____
____
____
____

GOVERNMENT AGENCIES ON-SCENE: _________________________________
____
____
____

INSTRUCTIONS: THE CONTRACTOR SHALL BE ATTACHED TO THE RAPID RESPONSE QUALITY CONTROL DAILY REPORT AND SHALL BE SUBMITTED DAILY AT THE CLOSE OF BUSINESS TO THE ON-SITE CORPS REPRESENTATIVE. CONCURRENTLY, THE CONTRACTOR SHALL PROVIDE ELECTRONIC ACCESS TO THE COMPLETED FORMS TO THE CORPS DISTRICT OFFICE AND THE AREA OFFICE.

1. DESCRIPTION OF WORK TO BE PERFORMED BY CONTRACTOR(S), WITH AN ESTIMATE OF THE PERCENTAGE TO BE COMPLETED:____________________
____
____
____
____
____
____
____
____
____
____

2. NUMBER OF PERSONNEL AUTHORIZED TO PERFORM WORK ON-SITE AND OFF-SITE.

SUPERVISORS		FOREMAN	
ENGINEERS		CHEMIST	
GEOLOGIST		SAFETY	
EMT		TECHS	
LABORERS		OPERATORS	

OTHERS (SPECIFY):

3. EQUIPMENT AND EXPENDABLE MATERIALS AUTHORIZED:

ITEM	QUANTITY	DURATION	ITEM	QUANTITY	DURATION

4. TEST AND/OR INSPECTIONS TO BE PERFORMED (INDICATE TYPE AND LOCATION): ____________________

5. ADDITIONAL COMMENTS/REMARKS: ____________________

6. CERTIFICATION: I CERTIFY THAT THE ABOVE WORK IS ORDERED AND AUTHORIZED BY THE ON-SITE CORPS REPRESENTATIVE IN THE PERFORMANCE OF THE ABOVE CITED CONTRACT.

____
ON-SITE CORPS REPRESENTATIVE

7. I ACKNOWLEDGE RECEIPT OF THIS WORK ORDER AND UNDERSTAND THAT ANY MODIFICATION TO THE WORK ORDER MUST BE IN WRITING AND APPROVED BY THE PROJECT MANAGER.

____
CONTRACTOR'S REPRESENTATIVE

8. WORK ORDER AMENDMENTS AND MODIFICATIONS (INCLUDE TIME, DESCRIPTION, AND AUTHORIZING PERSON): ______________________________

____
____
____
____
____
____
____
____
____

______________________________ ON-SITE CORPS REPRESENTATIVE

______________________________ CONTRACTOR'S REPRESENTATIVE

RAPID RESPONSE WEEKLY REPORT

U.S. ARMY RAPID RESPONSE
CORPS OF ENGINEERS OMAHA DISTRICT

Project Name ______________________ For Week Ending __/__/__

Project Location ______________________ Report No. _____

Name ______________________ Title ______________

Company Name & Address ______________________

Telephone No. (   ) _____-______ Telefax No. (   ) _____-______

Reporting Period: _____/_____/_____ to _____/_____/_____

Percent Field Work Completed _____% Percent Project Completed _____%

Summary of Work Completed On-Site: ______________________

Summary of Work Completed Off-Site: ______________________

RAPID RESPONSE WEEKLY REPORT CONT'D

Project Name & Location ____________________

For Week Ending ___/___/___

Explanation of Deviation from WorkPlan (Including Modifications and Schedule Slippages): ____________________

Problems Encountered: ____________________

Recommendations: ____________________

Key Personnel Changes: ____________________

RAPID RESPONSE WEEKLY REPORT CONT'D

Project Name & Location ____________________

For Week Ending ___/___/___

Work Anticipated to be Performed the Following Week: ____________________

Unit Price Quantities Reached to Date:

Unit Priced Item	Unit	Quantity To Date	Quantity Anticipated

Other Remarks: ____________________

Signature: ____________________

APPENDIX J

SITE RESTORATION INSTRUCTIONS

SITE RESTORATION

1. Backfilling.

1.1. Material Definitions.

1.1.1. Suitable Materials. Suitable materials are materials that classify according to ASTM D 2487 as GW, GP, GC, GM, SW, SP, SC, SM, CL, CH, and ML. Lime and flyash shall also be considered as suitable materials when used as stabilizing agents.

1.1.2. Unsuitable Materials. Unsuitable materials include all materials that are not defined above as suitable materials. In addition, unsuitable materials are materials that classify according to ASTM D 2487 as MH, Pt, OH, SP and OL. Unsuitable materials also include all material that contains debris, refuse, roots, organic matter, frozen material, fine grained sedimentary rocks (i.e., shale, claystone, siltstone, mudstone, and marl) even though they may be intensely weathered, contamination from hazardous, toxic, biological or radiological substances, stone having a maximum dimension larger than 3 inches in any dimension, or other materials that are determined by the Contracting Officer as unsuitable for providing a stable subgrade or stable foundation for structures. Otherwise suitable material which has excess moisture content shall not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials as determined by the Contracting Officer.

1.1.3. Cohesive and Cohesionless Materials. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, CL, ML, CH and MH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

1.2. All backfill material shall consist of suitable material as defined in paragraph 2.1.1 of this Appendix.

1.3. **Excavated** areas within the Building 348 storage yard **are** to receive gravel pavement **in accordance with Fort Riley requirements and** shall be backfilled using 6-inch loose lift layers compacted to 90 percent of maximum density. When cohesionless materials are used for backfill in areas within the Building 348 storage yard to receive gravel pavement, the top one foot of the backfill material shall be compacted to 95% maximum density. **The excavated areas in the storage yard shall be restored to match original conditions.**

1.4. **Excavated** areas outside the Building 348 Storage Yard **are** to receive topsoil and seeding and shall be backfilled in loose lift thicknesses of no more than twelve inches and compacted to at least 85 percent of maximum density. **The contractor shall restore the original grade.**

1.5. At the Colyer Manor Site, gravel from the temporary haul road shall be placed in the excavation and a minimum of one foot of backfill shall cover the entire excavated area. The backfill shall be placed in loose lift thicknesses

of no more than twelve inches and compacted to at least 85% of maximum density.

1.6. Compaction by flooding or jetting will not be permitted.

1.7. The Contractor shall place backfill around and above existing pipes, tanks, or appurtenances in a manner which will prevent damage to them. Initial backfill material shall be brought up evenly on both sides and shall be placed and compacted with approved tampers to a height of at least one foot above any exposed pipes, tanks, or appurtenances.

1.8. The Contractor shall replace the Building 348 Storage Yard gravel pavement to match existing and according to Fort Riley specifications.

1.9. The Contractor shall verify compaction densities in the field utilizing subcontracted personnel from an approved local laboratory. Compaction densities may be determined by any of the following methods: ASTM D 1556 (Sand-cone Method); ASTM D 2167 (Rubber Balloon Method); ASTM D 2922 (Nuclear Methods). The following frequencies shall be used:

1.9.1. For material placed according to paragraph 1.4, one test shall be performed for every 4000 square feet, more or less, of each 12 inch lifts. At a minimum, each excavation requires at least one test.

1.9.2. For material placed according to paragraph 1.3, one test will be performed for every 4000 square feet, more or less, of each 6 inch lift. At a minimum, each excavation requires at least two tests, one which must be taken from the top two lifts.

1.9.3. ASTM D 1557-78 shall be used to determine maximum density and optimum moisture for each type of backfill material used.

2. Topsoiling. Excavated areas outside the Building 348 Storage Yard **and at the Colyer Manor Site** shall receive a minimum of 6 inches of topsoil following backfill. Topsoil shall be representative of soils in the vicinity that produce heavy growths of crops, grass or other vegetation and is reasonably free from underlying subsoil, clay lumps, objectionable weeds, liter, brush, matted roots, toxic substances or any other materials that might be harmful to plant growth or be a hinderance to grading, planting or maintenance operations. Topsoil shall not contain more than 5% by volume of stones, stumps or other objects greater than 1 inch in any dimension.

3. Reseeding. The Contractor shall reseed excavated areas outside the Building 348 Storage Yard **and at the Colyer Manor Site** following backfill and topsoiling. The Contractor shall submit its reseeding plan for approval via the Workplan. **The Contractor is responsible for the establishment of turf in the reseeded areas.**

APPENDIX K

SITE SPECIFIC ADVANCED AGREEMENTS

SITE-SPECIFIC ADVANCED AGREEMENTS
FT. RILEY, KANSAS

- The work schedule will be 6 days per week, 10 hours per day.

- USACE or Fort Riley will provide OHM with site access. OHM will apply for and coordinate excavation permits. Fort Riley will process excavation permits in a timely manner.

- The proposal estimate is based on 325 tons of excavation and off-site disposal for Colyer site and 1,092 tons excavation and off-site disposal for PSF site plus 13 tons of drummed waste from the PSF to total 1,430 tons of total waste.

- Utility identification and marking will be performed by Ft. Riley prior to the start of excavations.

- The gas line at the PSF facility is the sole underground utility within a planned excavation area. It will not be required to cap or remove any part of the line. OHM intends to work around the line, and it is assumed for purposes of the proposal that no bracing or supports will be required for the line.

- No shoring or bracing will be required for building foundations or other structures.

- Transportation and disposal of PSF soils is based on it being characteristically hazardous only and can be stabilized and landfilled at a Subtitle C facility. OHM will receive a letter substantiating this prior to transportation and disposal arrangements. Disposal pricing and facility acceptance is contingent upon the disposal facility receiving a representative sample and performing a treatability study.

- The proposal does not include remobilization and additional excavation after initial confirmation sampling. It is assumed that initial confirmation samples will show results within clean up objectives.

- No weather event days are provided for in the schedule and proposal.

- Health and safety requirements include the following understanding:
  - OHM will conduct perimeter air monitoring at Colyer Manor site at 5 points for 2 days and will take a single additional QA sample (11 samples total). Battery-powered air sampling

pumps will be used and hung on posts approximately 4 feet aboveground level.

- OHM will test for personnel safety/lead exposure at Colyer Manor site by air sampling using a battery-powered air sampling pump. One sample will be taken after the first day of excavation.

- No perimeter air monitoring is required at the PSF site.

- OHM will monitor personnel safety for exposure to organophosphates; no testing for arsenic exposure is required. Sampling will be by a battery-powered air sampling pump. OHM will prepare and test 2 samples plus a single additional QA sample (3 samples total).

▸ Other advance agreements agreed upon during negotiations.

APPENDIX L

TRANSPORTATION AND DISPOSAL INTRODUCTION

RAPID/IMMEDIATE RESPONSE FIELD ACTIVITIES TRANSPORTATION AND DISPOSAL INSTRUCTIONS

28 JANUARY 1993

Attachments:
1. Transportation and Disposal Tracking Form
2. Rapid FORM 4025

1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this statement of work to the extent referenced. The publications are referred to in the text by the basic designation only. Applicable State laws and regulations shall be noted in the delivery orders to the extent known.

1.1. ENVIRONMENTAL PROTECTION AGENCY HAZARDOUS WASTE REGULATIONS.

40 CFR 61	National Emission Standards for Hazardous Air Pollutants

40 CFR 122	EPA Administered Permit Programs: The National Pollutant Discharge Elimination System
40 CFR 125	Criteria and Standards for the National Pollutant Discharge Elimination System
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, Disposal Facilities
40 CFR 265	Generators Requirements Under Treatment, Storage and Disposal Facility Standards
40 CFR 268	Land Disposal Restrictions
40 CFR 300	National Oil and Hazardous Substance Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities ("RQ's"), and Notification
40 CFR 355	Emergency Planning and Notification
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 761	Polychlorinated Biphenyls (PCB's) Amendments

1.2. DOT HAZARDOUS MATERIALS, SUBSTANCES, AND WASTE REGULATIONS. The Contractor shall follow 49 CFR 100 - 180 especially the regulations listed below.

49 CFR 171	General Information, Regulations and Information
49 CFR 172	Hazardous Materials Table & Communications, Emergency Response Information Requirements
49 CFR 173	General Requirements, Shipment/Packaging
49 CFR 177	Carriage by Public Highway
49 CFR 178	Packaging Requirements

2. GENERAL. The Rapid/Immediate Response (RR/IR) Contractor responsible for the tasks defined by this statement of work shall review all information provided and develop the necessary deliverables which contain the transportation and disposal criteria, procedures, and practices sufficient to protect personnel, the environment, and potential off-site receptors from the chemical, physical, and/or biological hazards. The Contractor shall utilize the services of a Regulatory Specialist (see Paragraph: "Contractor Regulatory Specialist") or equivalent experienced in hazardous waste manifesting and hazardous waste site operations. If the information that is available is insufficient to allow the Contractor to develop these documents, a description of all additional information required shall be prepared and submitted to the Contracting Officer, prior to the commencement of work.

3. WASTE DISPOSAL. Wastes generated under this contract will generally fall into one of two categories:

3.1. SOLID WASTE. Solid wastes shall be removed from the site by the Contractor and disposed of at a facility authorized by federal, state, and local laws to receive the waste. No wastes are to be burned, buried or otherwise left on-site without the written approval of the Contracting Officer.

3.2. EPA AND DOT REGULATED MATERIAL. Regulated materials consist of a wide variety of materials originating at the site or used on the site. Examples may include drill cuttings; water from well development, sampling, or decontamination; as well as solid and liquid wastes. All wastes shall conform to the requirements detailed in Paragraph: "Transportation, Storage, Treatment and/or Disposal of Hazardous Materials".

4. TRANSPORTATION, STORAGE, TREATMENT AND/OR DISPOSAL OF HAZARDOUS MATERIALS . The Contractor shall ensure the transportation, storage, treatment, and disposal of all hazardous materials complies with all federal, state, and local laws and regulations. The Contractor shall identify and perform any additional analyses necessary to ensure compliance with transportation, storage, treatment, and disposal requirements. Selection of the approved Treatment, Storage, or Disposal Facility (TSDF) shall be based upon cost-effectiveness, compliance status, regulatory agency input and Contracting Officer approval. If the waste is sent for off-site storage or disposal, the Contractor shall provide to the Contracting Officer at a minimum what is listed below.

4.1. SITE VISIT WASTE CHARACTERIZATION. The U.S. Army Corps of Engineers (USACE) Technical Manager (TM) shall notify the Contractor prior to the site visit if waste characterization sampling is required during the site visit. During the notification the sample quantities and analysis protocol shall be determined by the USACE-TM based on recommendations from the Contractor. At the site visit the Contractor shall collect all available documentation which could be utilized in waste stream characterization.

Documentation and data received shall be utilized by the Contractor in definition of waste streams and in determining the Treatment, Storage, or Disposal option which is the most cost-effective and in compliance with Federal, State and Local laws and regulations. Waste characterization performed after the site visit shall be done in accordance with Appendix C: "Chemistry Instructions." For deviation from Appendix C, the Contractor shall receive prior approval from the USACE-TM.

4.2. TRANSPORTATION. Transportation to an approved TSDF shall comply with all appropriate DOT regulations. The Contractor shall judiciously coordinate the transportation of waste so that transporters arrive on schedule. Within the Cost Proposal, the Contractor shall provide the name, location, point-of-contact, EPA identification, verify that the transporter is a licensed Hazardous Waste Transporter in accordance with DOT regulations, and the Notice of Violation (N.O.V.) status.

4.3. IDENTIFICATION OF THE DISPOSAL FACILITY. The Contractor shall characterize the waste stream to determine the most cost-effective TSDF facility which is in compliance with Federal, State and Local laws and regulations. A minimum of three quotes will be submitted in the Cost Proposal for treatment, storage or disposal of each waste stream. For each quote the Contractor shall provide the facility name, location, point of contact, telephone number, unit cost, total cost for treatment, storage or disposal, transportation, taxes and disposal fees. Additionally, the Contractor shall provide in the Cost Proposal a list of all TSDF facilities contacted, regardless if a quote was not received. The list shall state the facilities name, location, point of contact, cost data, telephone number and reason quote was not received. Based on the information received during this process the Contractor shall provide within the Cost Proposal the name, location, point-of-contact, identification, and N.O.V. status of the selected disposal facility.

4.4. ANALYTICAL AND MANIFEST PACKAGE. The Contractor shall provide the analytical and the complete manifest package as required in Paragraph: "Complete Manifest Package".

4.5. SHIPMENT TRACKING. The Contractor shall notify the Contracting Officer if shipments to the TSDF are within the required time frames and provide all required reports if receipt has been delayed (i.e. discrepancy reports or exception reports, see Paragraphs: "Discrepancy Reports" and "Exception Reports" for details).

4.6. TRACKING OF HAZARDOUS AND/OR SOLID WASTES. Hazardous and/or solid wastes shall be removed from the site by the Contractor and disposed of at a facility approved by the Contracting Officer. The Contractor shall receive written acceptance from the TSDF prior to mobilization for T&D. The Contractor shall submit and utilize a tracking system acceptable to the Contracting Officer. In instances where characteristic wastes are deactivated on site at the TSDF and sent to a Subtitle D facility, the Contractor will follow appropriate notification and certification requirements under 40 CFR 268.9. This information shall be presented in the Final Project Report.

5. COMPLETE MANIFEST PACKAGE. The "complete manifest package" consists of, at a minimum, all hazardous waste manifests, PCB manifests, hazardous material shipping papers, waste profile sheets, the land disposal restriction notification and certification forms, and all other supporting documentation. Supporting documentation shall include waste disposal history, all analytical results, material safety data sheets available, and any other information received in identifying the proper waste code. The Contractor shall also include as part of the supporting documentation, the specific type of inner and outer packaging, markings, labeling, and placards offered to the transporter. The Contractor shall also comply with the requirements below.

5.1. PREPARATION. The Contractor shall have a single Contractor Regulatory Specialist (CRS) (see Paragraph: "Contractor Regulatory Specialist") review the complete manifest package and shipping documentation. The CRS shall certify as correct the Hazardous Waste Manifest, Waste Profile Sheets, and Land Disposal Restriction Notification and Certification forms and supporting documentation. Once the review is completed, the Contractor shall submit these documents to the Contracting Officer for approval.

5.2. SUBMITTAL. The CRS shall submit to the Contracting Officer Representative (COR) who is the Regulatory Specialist for approval, a reproducible copy of the complete manifest package for each particular waste stream. The Contractor shall hold the original "complete manifest package" and make corrections based on Contracting Officer approval (see Paragraph: "Approval") prior to submittal to the generator's representative for signature. Submittals that are disapproved will be returned to the Contractor to be revised. The submittal of the complete manifest package shall be attached to Rapid FORM 4025 (see Paragraph: "Transmittal Form (Rapid Form 4025)" for additional submittal details).

5.3. APPROVAL. The Contractor shall not transport or ship any wastes prior to Contracting Officer approval of the complete manifest package. The Government will make every effort to conduct the approval process within three (3) working days after the Contracting Officer receives the complete manifest package. If the regulators are unavailable or extensive review of Federal or State law is required, the Government reviewer will notify the USACE On-Site Representative (OSR) of any delays on or before the second day of the review and arrange for an alternate review period agreeable to both parties. After the review process is completed, the Contracting Officer shall telecopy to the CRS and the USACE-OSR the completed Rapid FORM 4025.

5.4. DESIGNATION OF GENERATOR. The generator and signer of Hazardous Waste Manifests, Waste Profile Sheets and Land Disposal Restriction Notifications and Certifications shall be identified by the Contracting Officer during the preconstruction conference. The Contractor shall submit a fully executed and complete manifest package, including final disposition information, covering all solid and hazardous waste disposal under this contract as an appendix in the Final Project Report covering the field activities, as well as the above information and quantities shipped.

5.5. TRANSPORTATION OF THE MANIFESTED WASTE. The Contractor's on-site personnel overseeing the transporter prior to shipment of the hazardous waste shall certify that the packaging, marking, labeling, handling, and placarding of waste complies with Federal, State, and local laws and regulations and it correlates with the waste classification and quantities designated on the manifest prior to the signature of the Transporter. The certification shall be submitted to the USACE-OSR prior to transport and included as part of the Final Project Report. The On-site person responsible for certification shall be trained as per 49 CFR 172.700.

5.6. GENERATOR STATUS. The Contractor shall determine the contribution to the generator's status at the site, for work generated under this Delivery Order, based on Federal, State, and local laws and regulations. Generator status may include conditionally-exempted small quantity generator, small quantity generator, and generator.

6. REPORTING REQUIREMENTS.

6.1. HAZARDOUS WASTE MANIFEST ANNUAL AND/OR BIENNIAL REPORTING REQUIREMENTS. All information necessary to file the Annual and/or Biennial reports shall be prepared and submitted by the Contractor to the Contracting Officer for each project to meet all requirements of 40 CFR 262.41 and any other applicable Federal or State law or regulation, as a part of the Final Project Report. These report sections shall contain all the information necessary for the filing of the formal report in the form and format required by the governing Federal or State regulatory agency. A cover letter shall accompany the report to include the Contract number; Contractor name; USACE Rapid/Immediate Response project name; location of project; report type; and date of submittal.

6.2. TABULATED WASTE HANDLING INFORMATION. The Contractor shall list all waste materials going off-site including the description, quantity, destination, purpose, the hazardous waste classification, when the waste was manifested, samples taken, results, transportation plans, disposal facility, etc; if applicable. This information shall be included in the Weekly Status Report. Refer to the main section of the statement of work, Paragraph: "Weekly Status Report" for details.

6.3. STATE REPORTING REQUIREMENTS. The Contractor shall determine the State reporting requirements (i.e. generator State and/or disposal State) and obtain current State reporting forms. A completed draft of all required forms, with applicable attachments, shall be submitted to the Contracting Officer for approval prior to submission to the Federal or State Regulator. The State reporting forms shall also be included within the Final Project Report.

6.4. TRANSPORTATION AND DISPOSAL TRACKING FORM. The Contractor shall complete the Transportation and Disposal Tracking Form (see attached). This form allows the tracking of key T&D milestones throughout the performance of this delivery order. The form lists all waste materials going off-site and shall be included as part of the Weekly Status Report. Refer to the main section of the statement of work, Paragraph" Weekly Status Report" for details. When tracking the waste the Contractor shall identify the date that the transporter accepts the waste by their signature on the manifest.

6.5. DISCREPANCY REPORTS. Discrepancies due to differences between the quantities or types of hazardous waste designated on the manifest or shipping papers, and the quantity or type of hazardous waste a facility actually receives shall be reported to the Contracting Officer and rectified by the Contractor within 15 days after receiving the waste in accordance with 40 CFR 264.72 and 40 CFR 265.72. This information shall be presented in the Final Project Report.

6.6. EXCEPTION REPORTS. The Contractor shall verify if the generator or generator representative has received a copy of the signed manifest from the TSDF on or before the 35th day after transporter signature in accordance with 40 CFR 262.42. If the generator or generator's representative has failed to receive a signed copy of the manifest by the 44th day, the contractor shall prepare a draft EPA exception report for Contracting Officer approval. The Final exception report shall be submitted to the Contracting Officer no later than Day 45. This information shall also be presented in the Final Project Report. Prior to official submittal of Exception Report, a draft copy of the report shall be submitted to the Contracting Officer for review. The Government will make every effort to conduct the approval process within three (3) working days after the Contracting Officer receives the complete Exception Report.

6.7. TOXIC SUBSTANCE CONTROL ACT PCB REPORTING REQUIREMENTS. If specified in this statement of work or in the event of discovery of equipment or containers or any media including soil or water with PCB-contaminated fluid impacted by the work in Delivery Order, the Contractor shall:

6.7.1. notify the USACE-OSR immediately and report the findings in the daily and weekly report;

6.7.2. complete and submit all necessary logs and reports in accordance with 40 CFR 761.180;

6.7.3. satisfy all manifest and reporting requirements as specified in Paragraphs "Complete Manifest Package" and "Reporting Requirements" above, and as otherwise applicable to the PCB containing material;

6.7.4. arrange for the proper disposal of the waste; and, when disposal is completed, certify that the PCB contaminated material was disposed properly in accordance with all applicable Federal, State, and local requirements; and

6.7.5. report all information concerning the incident, and include copies of all related documents in the Final Project Report.

7. SPILL CONTROL. The Contractor shall prevent spills and provide contingency measures for cleanup of potential spills during performance of this contract. The Contractor shall:

7.1. Take adequate measures to prevent spills during excavation, handling, packing, transportation, storage or other operations performed during this contract.

7.2. Provide all emergency measures required to contain any spillages and to remove or remediate all wastes or substances that become contaminated due to spillage. If this is a fixed price delivery order, and the spill is due to the actions of the contractor or any subcontractor, the contractor shall be responsible for taking all necessary actions at their own expense to correct any and all damage caused by the spill, or shall be liable to the government for all costs incurred or losses suffered by the Government as a result of any and all damage caused by the spill, or some combination of these remedies, at the discretion of the Government. If this is a cost reimbursement delivery order, the contractor shall be responsible for taking all necessary actions to correct any and all damage caused by the spill, and allowability of costs incurred by the contractor shall be determined by the contract clauses, "Allowable Cost and Payment", and "Insurance - Liability to Third Persons" and any other applicable clauses. At a minimum, the following emergency procedures shall be performed by the Contractor if a spill occurs:

7.2.1. Immediately (within 1 hour) notify the Contracting Officer to discuss contact of the National Response Center.

7.2.2. Take immediate measures, utilizing properly protected personnel, to control and contain the spill, as required by the Site Safety and Health Plan (SSHP).

7.2.3. The contractor shall document all details of the incident, including written statements of witnesses, photographs, videotapes, and sampling results, as applicable.

7.3. Provide all decontamination measures required as a result of the removal of spilled wastes or substances. Decontamination residues shall be properly disposed of as directed by the Contracting Officer.

8. CONTRACTOR PERSONNEL AND QUALIFICATIONS. The requirements for on-site and off-site personnel in regards to transportation and disposal of hazardous waste are listed below.

8.1. CONTRACTOR REGULATORY SPECIALIST. For all RR/IR delivery orders issued to the Contractor, the Contractor shall designate a dedicated Contractor Regulatory Specialist (CRS). The CRS shall be responsible for all regulatory matters, compliance issues, and permit requirements as specified in Paragraphs: "Transportation, Storage, Treatment and/or Disposal of Hazardous Wastes" and "Complete Manifest Package" in accordance with the approved statement of work, Contractor's approved Work Plan (WP), SSHP, Contractor Sampling and Analytical Plan (CSAP), and all federal, state, and local laws and regulations. The CRS shall coordinate review and approval of all RR/IR manifests and related documentation. The CRS qualifications shall be described in a resume which shall be submitted for approval in the Site-Specific Advance Agreements (SSAA) and any changes to the personnel used in this position shall be approved by the Contracting Officer in writing. Specific responsibilities of the CRS include but are not limited to the following:

8.1.1. Ensure that all hazardous waste is properly transported and disposed at a permitted TSDF in compliance with all applicable Federal, State, and local requirements.

8.1.2. Coordinate with USACE and the Contractor's Project Manager on performing any additional analysis necessary to ensure compliance with treatment and disposal requirements.

8.1.3. Assist in the selection of a RCRA permitted TSDF. Selection of the facilities shall be based upon the facility having proper permits for hazardous waste to be disposed, the incidence and nature of regulatory enforcement actions involving the facility, cost-effectiveness, environmental compliance, regulatory agency input, and Contracting Officer approval.

8.1.4. Ensure that all contractor personnel involved in the waste handling are properly trained in packaging, marking, labeling, handling, placarding, storage, transportation, treatment, and disposal requirements of the particular waste as required by federal, state and local laws and regulations.

8.1.5. Ensure the facility's permit status when identifying potential TSDFs and prior to actual shipment of waste for each delivery order requiring waste treatment, disposal, or storage.

8.1.6. Perform quality assurance reviews of all draft and final hazardous waste manifests, and certify as correct the Hazardous Waste Manifest, Waste Profile Sheets, Land Disposal Restriction Notification and Certification forms, and all other documents required by Federal, State, or local laws for each shipment of waste required by any delivery order.

8.1.7. Track shipment to ensure receipt of waste in required time frames and filling out any associated reports as required (i.e. discrepancy reports).

8.1.8. Ensure that all Discrepancy and Exception Reports are completed in accordance with 40 CFR 264.72, 265.72, and 262.62 (See paragraph: "Discrepancy Reports" and "Exception Reports").

8.1.9. Develop procedures to track transportation and disposal of hazardous waste for each Contractor's regional offices (i.e. comprehensive Transportation and Disposal Tracking Form).

8.1.10. Periodic site visit to perform quality assurance checks during packaging, marking, labeling, handling, placarding, and shipment phase of the project.

8.1.11. Maintaining close communication and coordination with USACE's Regulatory Specialist.

8.1.12. Drafting or coordination of the WP, SSHP, CSAP, and SSAA development pertaining to regulatory issues.

8.1.13. Assure compliance and smooth transitions necessary for the implementation of new D.O.T. requirements (i.e. hazard communication, Performance Oriented Packaging, DOT training per 49 CFR 172.700, etc.). Prior to the effective date (October 1, 1993), the Contractor is expected to use the "new" 49 CFR 172.101 tables when possible.

8.1.14. Maintain familiarity and understanding of Federal, State and local laws and regulations pertaining to handling of all types of solid or hazardous waste. Become informed of all new or changed requirements, disseminate the information to appropriate contractor personnel, and assure implementation, whenever required.

8.2. ON-SITE PERSONNEL. The Contractor shall utilize a trained, experienced on-site person to ensure that all on-site procedures for transportation and disposal of hazardous wastes as stated in this statement of work are implemented and enforced on-site.

The Contractor's on-site personnel overseeing the transporter prior to shipment of the hazardous waste shall ensure that the packaging, marking, labeling, handling, and placarding of waste complies with Federal, State, and local laws and regulations and it correlates with the waste classification and quantities designated on the manifest prior to the signature of the Transporter.

The On-site person responsible for certification shall be trained as per 49 CFR 172.700. The on-site person qualifications shall be described in a resume which shall be submitted for approval in the Site-Specific Advance Agreements and any changes shall be approved by the Contracting Officer.

9. TRANSMITTAL FORM (Rapid Form 4025). The sample transmittal form (Rapid Form 4025) is attached and shall be used for submitting the complete manifest package for Government approval in accordance with the instructions on the reverse side of the form. This form shall be properly completed by filling out all the heading blank spaces of Section I of the form and identifying each item submitted.

9.1. GENERAL.

9.1.1. CONTRACTOR RESPONSIBILITIES. The Contractor is responsible for total management of their transportation and disposal procedures including scheduling, control, and certification of all manifest submittals. An integral part of the certification procedure is proper identification of listed waste streams. The Contractor is responsible for reviewing generator supplied site documentation and submitting as part of the manifest package the logic and/or telecopy relied upon in making the determination. If records or waste history are unavailable, the Contractor shall interview the generator or any available past site workers present when the wastewater disposed to ascertain the origin of the waste. If requested by the Contracting Officer, the Contractor shall draft for generator signature a letter to the TSDF certifying that the information listed is based on available historical data.

9.1.2. GOVERNMENT RESPONSIBILITIES. The Government will review submittals designated for Government approval and approve those that conform to contract requirements. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for ensuring that the quantities, waste characterizations and classifications, and all other details of the waste on-site matches what is on the manifest prior to signature of the manifest. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of changing the manifest's waste classification will be given consideration unless accompanied by justification as to why a change is necessary.

9.1.3. DISAPPROVED SUBMITTALS. The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected complete manifest package in the form and number of copies as specified for the initial submittal. The Contractor shall examine his quality control plan and organization to determine why his controls did not identify the deficiency. Appropriate adjustments will be made in the quality control program and/or implementation.

9.2. EXECUTION.

9.2.1. GENERAL. Submittals shall be made in the respective number of copies and to the respective addresses set forth below. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with all contract requirements. Prior to submittal, all items shall be checked and approved by the CRS and each respective transmittal form (Rapid Form 4025) shall be signed and dated by the CRS certifying that the accompanying submittal complies with all the contract requirements. Proposed deviations from the contract requirements shall be clearly identified.

9.2.2. SUBMITTAL REQUIREMENTS WITHIN THE STATEMENT OF WORK. A submittal list of wastes will not be generated for all wastes that are required to be manifested as part of the statement of work. The Contractor shall coordinate this effort with the Contracting Officer on-site for each individual delivery order.

9.2.3. SUBMITTAL PROCEDURE. The complete manifest package with attached signed Rapid FORM 4025 shall be mailed via a carrier service that will provide overnight service or unless otherwise directed to the address below:

District Engineer, Department of the Army
Corps of Engineers, Omaha District
ATTN: CEMRO-CD-FC (Rasmussen)
P.O. BOX 13287, Bldg. 527
Fairchild Hall, 3rd Floor
Offutt AFB, Nebraska 68113
Phone: (402) 291-4260
Fax: (402) 291-8177

Three (3) copies of the complete manifest package and signed Rapid FORM 4025 shall be mailed via a carrier service that will provide overnight service, such as Express Mail or unless otherwise directed to the address below:

District Engineer, Department of the Army
Corps of Engineers, Omaha District
ATTN: CEMRO-ED-EH (Slattery/Graham)
215 N. 17th Street
Omaha, NE 68102-4978
Phone: (402) 221-7681
Fax: (402) 344-4580

If requested in the delivery order statement of work, a completed information copy of the attached transmittal form shall also be mailed to the USACE-TM Rapid Response Section:

District Engineer, Department of the Army
Corps of Engineers, Omaha District
ATTN: CEMRO-ED-ER (USACE-TM) *
215 North 17th Street
Omaha, Nebraska 68102-4978
Phone: (402) 221-7760 *
Fax: (402) 221-7793

* or as specified in the Submittal Register *

9.2.4. DEVIATIONS. For submittals which include proposed deviations requested by the Contractor, the column "variation" of Rapid Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind approval of submittals containing unnoted deviations. Approval of a submittal containing a deviation will not constitute approval of the deviation. The Government retains the right to require compliance with the contract notwithstanding the deviation, the contractor shall be responsible for compliance unless a deviation is specifically approved after written notice and justification.

9.2.5. CONTROL OF SUBMITTALS. The Contractor shall carefully control his procurement operations to ensure Contracting Officer approval of manifesting packages prior to transportation of the hazardous waste of the project site.

9.2.6. GOVERNMENT APPROVED SUBMITTALS. Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated.

10. REGULATOR NOTICES OF NON-COMPLIANCE. In the event the contractor is notified by a Federal, State, or local agent that a manifest, shipment, waste disposal, or any related activity concerning a delivery order under this contract is not in order or not in compliance with any requirement, the contractor shall notify the Contracting Officer immediately. The contractor shall furnish to the Government copies of all notices and all relevant documents, including correspondence, subcontracts, lab reports, memoranda, etc. and any other documents requested by the Government. The contractor shall coordinate its response to the notice with the Contracting Officer or his designated representative prior to submission to the notifying authority, and shall furnish a copy to the Contracting Officer of all documents submitted to the authority, included the final reply to the notice.

11. SUBCONTRACTOR COORDINATION. If the subcontractor, or consultant, or agent is retained by the contractor to perform any of the work required by this section of the contract, the subcontract shall include all of this section, with appropriate adjustments for the subcontract, and include the CRS or other authorized employee of the contractor as the point of contact for the submittals and communications between the subcontractor and the Government. The contractor shall remain responsible for compliance with this section and all other portions of the contract and shall sign all certifications required by the contract.

TRANSPORTATION AND DISPOSAL TRACKING FORM

1 WASTE STREAM 2 DISPOSAL FACILITY	3 - WPS a. To COE b. Number c. COE Approval d. To TSDF	4 - TSDF APPROVAL 5 - P.O.#	6 - MANIFEST a. To COE b. Number c. COE Approval	7 - PICKUP a. Scheduled b. Actual c. Acceptance	8 TSDF RECEIVED MANIFEST	9 NO. OF DAYS	10 DATE MANIFEST TO CLIENT	11 DATE EXCEPTION RPT FILED	12 - SUBTITLE FACILITY a. Yes/No b. If Yes, Date Documentation Received
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.
	a. b. c. d.		a. b. c.	a. b. c.					a. b.

WPS = WASTE PROFILE SHEET | COE = CORPS OF ENGINEERS | TSDF = TRANSPORTATION & STORAGE DISPOSAL FACILITY | P.O. = PURCHASE ORDER

TRANSPORTATION AND DISPOSAL TRACKING FORM

1 WASTE STREAM 2 DISPOSAL FACILITY	3 - WPS a. To COE b. Number c. COE Approval d. To TSDF	4 - TSDF APPROVAL 5 - P.O.#	6 - MANIFEST a. To COE b. Number c. COE Approval	7 - PICKUP a. Scheduled b. Actual c. Acceptance	8 TSDF RECEIVED MANIFEST	9 NO. OF DAYS	10 DATE MANIFEST TO CLIENT	11 DATE EXCEPTION RPT FILED	12 - SUBTITLE D FACILITY a. Yes/No b. If Yes, Date Documentation Received
Arsenic Solid Michigan Disposal 49350 N I-94 Svc Dr. Belleville, MI 48111 313-699-7120 POC:	a. 7/9/92 b. T#008565 c. 7/27/92 d. 7/28/92		a. b. c.	a. b. c.					a. b.
Mercaptide Waste Technology Services/Rollins 640 Park Place Niagara Falls, NY 14301 716-282-4100 POC: Martin Gregg	a. 7/14/92 b. N/A c. 7/27/92 d. 7/28/92	9/18/92 #L33663	a. b. c.	a. b. c.					a. b.
Ethanol/Water LWD, Inc. Highway 1523 Calvert city, KY 42029 502-395-8313 POC: Allen Orth/Keen McK	a. 7/21/92 : 8/14/92 b. N/A : N/A c. 8/26/92 d. 8/26/92	9/17/92 #JZ50	a. 9/21/92 b. 00001 c.	a. b. c.					a. b.
ECD Cell Nuclear Sources & Svcs. P.O. Box 34042 Houston, TX 77234 713-641-0391 POC: Kingsley Hawthorn	a. N/A b. N/A c. N/A d. N/A	N/A 711287	a. N/A b. N/A c. N/A	a. N/A b. 7/31/92 c. 7/31/92				None Needed	a. b.
Flammable Organic Systech Environmental Co. 11397 Road 176 Paulding, OH 45879-0266 800-888-8011 POC: Rhonda Lambert	a. 8/12/92 b. AA33962 c. 8/20/92 d. 8/25/92	112011	a. Bulked with CLOLIQ-2 b. c.	a. b. c.					a. b.
Sulfur Georgia Gulf Sulfur Spring Creek Road Bainbridge, GA 31717 912-244-0000 POC: Jessy Meerandville	a. N/A b. N/A c. N/A d. N/A	N/A N/A	a. N/A b. Bill/Lading c. 8/11/92	a. 8/12/92 b. 8/12/92 c. 8/12/92				None Needed	a. b.
CLOLIQ ENSCO American Oil Road El Dorado, AR 71730 304-343-9249 POC: Russel Lecoste	a. 8/14/92 b. 193479 c. 8/20/92 d. 8/25/92	9/3/92 112026	a. 9/28/92 b. c.	a. b. c.					a. b.
Chromium Solid Envirosafe Services 876 Otter Creek Road Oregon, OH 412-936-8272 POC: Blaine Hinds	a. 8/19/92 b. N/A c. 8/25/92 d. 9/1/92	9/22/92 112031	a. 9/28/92 b. c.	a. b. c.					a. b.

WPS = WASTE PROFILE SHEET

COE = CORPS OF ENGINEERS

TSDF = TRANSPORTATION & STORAGE DISPOSAL FACILITY

P.O. = PURCHASE ORDER

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MANIFESTS, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

(Read instructions on the reverse side prior to initiating this form)

DATE:

TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO:.	CHECK ONE: ( ) THIS IS A NEW TRANSMITTAL ( ) THIS IS A RESUBMITTAL OF TRANSMITTAL ________
SPECIFICATION SEC NO. (Cover only one section with each transmittal)	PROJECT TITLE AND LOCATION		

ITEM NO. a.	DESCRIPTION OF ITEM SUBMITTED *(Manifest Description, number of pages, type size, model number, etc.)* b.	MFG OR CONTR.CAT., CURVE, OR MANIFEST NO. (See instruction no. 8) c.	NO. OF COPIES d.	CONTRACT SPEC/DRWG e.	NUMBER OF PAGES f.	FOR CONTRACTOR USE CODE g.	VARIATION (See instruction No. 6) h.	FOR CE USE CODE i.
1.								
2.								
3.								
4.								

SECTION II - PROJECT CONTACTS AND PERSONNEL REVIEWING SUBMITTALS *(This section will be initiated by the USACE-OSR and Environmental Branch)*

	POINTS OF CONTACT:	PHONE:	FAX:	ITEM NO. (Block a.) p.	NAME OF TSDF: q.	COMPLIANCE: (YES/NO) r.	DATE CHECKED: s.
j.	TM:						
k.	PE:			1.			
l.	OSR:			2.			
m.	OTHER:			3.			
n.	IH REVIEW BY: (Initials) ________ DATE:		o. CHEM REVIEW BY: (Initials) ________ DATE:	4.			

REMARKS

REVIEW COMMENTS ATTACHED? ( )YES ( )NO

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract statement of work and meets all federal, state, and local laws and regulations except as other wise stated.

NAME AND SIGNATURE OF CONTRACTOR

SECTION III - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY	DATE

SHEET OF

1. ALL COPIES OF MANIFESTS FOR REVIEW SHALL HAVE THIS FORM ATTACHED AND PROPERLY FILLED OUT.

2. SUBMIT COPIES OF MANIFESTS OR WASTE PROFILE SHEETS FOR REVIEW. DO NOT SUBMIT ORIGINALS.

3. SECTION I shall be completed by the Contractor in the required number of copies specified in the delivery order.

4. All Rapid Form 4025 shall be printed legibly or typed, however, typing is not required.

5. Separate transmittal form will be used for submittals under separate transportation dates for shipment.

6. An accompanied letter by the contractor is not required.

7. DATE at the top of form will be the date submitted to the government which is to be completed by the Contractor.

8. TRANSMITTAL NO. Each new transmittal shall be numbered consecutively in the space provided for "Transmittal No." to include Contractor, DO#, and submittal # (i.e. ITC33-04). This number is in addition to the contract number for identifying each submittal. Transmittal number for resubmittal will contain an alphabet letter following original transmittal number (i.e. resubmittal of Transmittal Number ITC33-04 will be Transmittal Number ITC33-04a).

9. TO: box will contain the name and address of the office which will review the submittal. Contractor is to complete this box after reviewing the classification provided by the government in the statement of work when determining the proper address.

10. FROM: box will be the name and address of the Contractor (e.g. coorporate or regional) submitting the form. Contractor is to complete this box.

11. CONTRACT NO. box will contain the Contractors construction contract and deliver order numbers (i.e. DACXXX-XX-C-XXXX, DO# 000).

12. CHECK ONE box will be completed by the Contractor. Mark one space. If a resubmittal is provided indicate the last transmittal number.

13. SPECIFICATION SECTION NO. box will be completed by the Contractor, when applicable. The number will be the six digit number found in the specifications. No more than one section will be covered with each transmittal.

14. PROJECT TITLE AND LOCATION box will be completed by the Contractor.

15. Column a, is already completed.

16. Column b, will be completed by the Contractor. The description of each item plus any other data necessary to describe the item. The Contractor shall submit each submittal register item all at once on one transmittal if possible. If a submittal register item can not be submitted all at once Contractor should note that in the remarks box. If a submittal register item requires several items, description shall contain submittal register description plus any additional specific descriptions. Additional items not on the submittal register will be noted in the remarks box.

17. Column c, will be completed by the Contractor. The information will be the appropriate submittal description number or Manifest number of the item submitted.

18. Column d, will be completed by the Contractor. The number of copies will be as required by the statement of work.

19. Column e, will be completed by the Contractor. The Contractor shall state all applicable paragraph numbers.

20. Column f, will be completed by the Contractor. The Contractor shall state all applicable drawing sheet numbers.

21. Column g, will be completed by the Contractor. The action codes will be one of the following:

A - Approved as submitted.
B - Approved, except as noted.
C - Approved, except as noted. Refer to attached.
G - Other (specify).

22. Column h, will be completed by the Contractor. A check shall be placed in this column when a submittal is not in accordance with the statement of work also, a written statement to that effect shall be included in the space provided for "Remarks".

23. Column i, will be completed by the government. The action code will be one of the following:

A - Approved as submitted.
B - Approved except as noted. Resubmission is not required.
C - Approved, except as noted. Refer to attached, resubmission required.
D - Will be returned by separate correspondence.
E - Disapproved (See Attached).
Fx - Receipt acknowledged, does not comply as noted with contract requirements.
G - Other (specify).

** Section II - j through s, shall be completed by the government (e.g. USACE-OSR or Environmental Branch).

24. Column j through m. will be completed by the Government. These are the pertinent points of contact who will review the submittal.

25. Column n and o are to be filled out by the Government. The Industrial Hygienist and Chemist responsible for the review shall initial and date to verify that the review has been completed.

26. Column p through s will be filled out by the Government with the exception of Column q which will be filled out by the Contractor. This serves as the Government's check on the compliance of the proposed disposal facility identified in each manifest. The "Item No" will be the same as that in Column a.

27. REMARKS box self explained. If additional remarks are needed, indicate that a page is attached. This Column can be filled out by the contractor or Government.

28. Contractor must sign all Rapid Form 4025s to certify conformance.

29. Section III will be completed by the Government. Contractor is not to write in this space.

NOTE: Approval of items does not relieve the contractor from complying with all the requirements of the contract.

EXHIBIT II

REVISED CLEAN-UP OBJECTIVES

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

January 3, 1994

REPLY TO
ATTENTION OF
Environmental Branch

Phil Conner
Project Manager
OHM Corporation
1001 Warrenville Road, Suite 400
Lisle, Illinois 60532

Dear Mr. Conner:

Reference our November 29, 1993 request for your company to provide Rapid Response support under Contract Number DACW45-94-D-0005, Delivery Order 2, for excavation and disposal of contaminated soils at two separate sites at Fort Riley, Kansas.

Please find enclosed revised clean-up objectives for the Rapid Response Removal of Contaminated Soils, Pesticide Storage Facility and Colyer Manor Site, Fort Riley, Kansas. The clean-up objectives will be formally revised in the scope of work for this delivery order following negotiations. The clean-up objectives have been revised to reflect chemical-specific applicable or relevant and appropriate requirements listed in the Action Memorandums for each of these sites. These Action Memorandums have been provided to you through a separate correspondence.

If you have any questions regarding this correspondence, please contact Mr. Joseph R. Shields of my staff at telephone number (402) 221-7765.

Sincerely,

Robert F. Smart

Robert F. Smart, P.E.
Asst Chief, Environmental Branch
Engineering Division
Authorized Representative of the
Contracting Officer

Enclosure

CLEAN-UP OBJECTIVES
RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS
PESTICIDE STORAGE FACILITY AND COLYER MANOR SITE
FORT RILEY, KANSAS

PESTICIDE STORAGE FACILITY

CHEMICAL	CLEAN-UP OBJECTIVE LISTED IN DRAFT SOW	REVISED CLEAN-UP OBJECTIVE
Chlordane	0.5 ppm	0.17 mg/kg
Dieldrin	0.04 ppm	0.014 mg/kg
DDT	2 ppm	0.66 mg/kg
Heptachlor	0.2 ppm	0.050 mg/kg
Arsenic	80 ppm	Background*

* Background will need to be established. Please propose in the Workplan how background will be established.

COLYER MANOR SITE

CHEMICAL	CLEAN-UP OBJECTIVE LISTED IN DRAFT SOW	REVISED CLEAN-UP OBJECTIVE
Lead	400 mg/kg	500 mg/kg

APPENDIX A

CONTRACTOR'S SAMPLING AND ANALYSIS PLAN

FINAL CONTRACTOR'S SAMPLING AND ANALYSIS PLAN FOR RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS PESTICIDE STORAGE FACILITY AND COYLER MANOR SITES, FORT RILEY, KANSAS

CONTRACT NO. DACW45-94-D-0005
DELIVERY ORDER NO. 2

Submitted to:

United States Army Corps of Engineers
Omaha, Nebraska

Approved by:

Phil Connor

Phil Connor
Project Manager
Midwest Region

Prepared by:

OHM Remediation Services Corp.

Willis R. Moody 824

Willis R. Moody
QC Supervisor

January 25, 1994
Project 15480.1

TABLE OF CONTENTS

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE) has tasked OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, under the Rapid Response Contract No. DACW45-94-D-0005, Delivery Order No. 2, to perform excavation and disposal of contaminated soil at two separate sites at Fort Riley, Kansas.

This Contractor's Sampling and Analysis Plan (CSAP) describes OHM's responsibilities with respect to the sampling and analysis associated with this work effort. This CSAP is intended to be a site-specific guide for the field team for the project required sampling and analysis. The CSAP details all field activities, laboratory activities, and documentation related to the chemical data generated during the site precharacterization, disposal activities, and confirmation that the removal action has met the project goals.

1.1 SITE HISTORY

Fort Riley is located in northeast Kansas near the confluence of the Republic and Smoky Hill Rivers. Fort Riley occupies approximately 150 square miles in Geary and Riley Counties (see Figure 1.1) This Rapid Response Action will address removal activities at two locations on the fort:

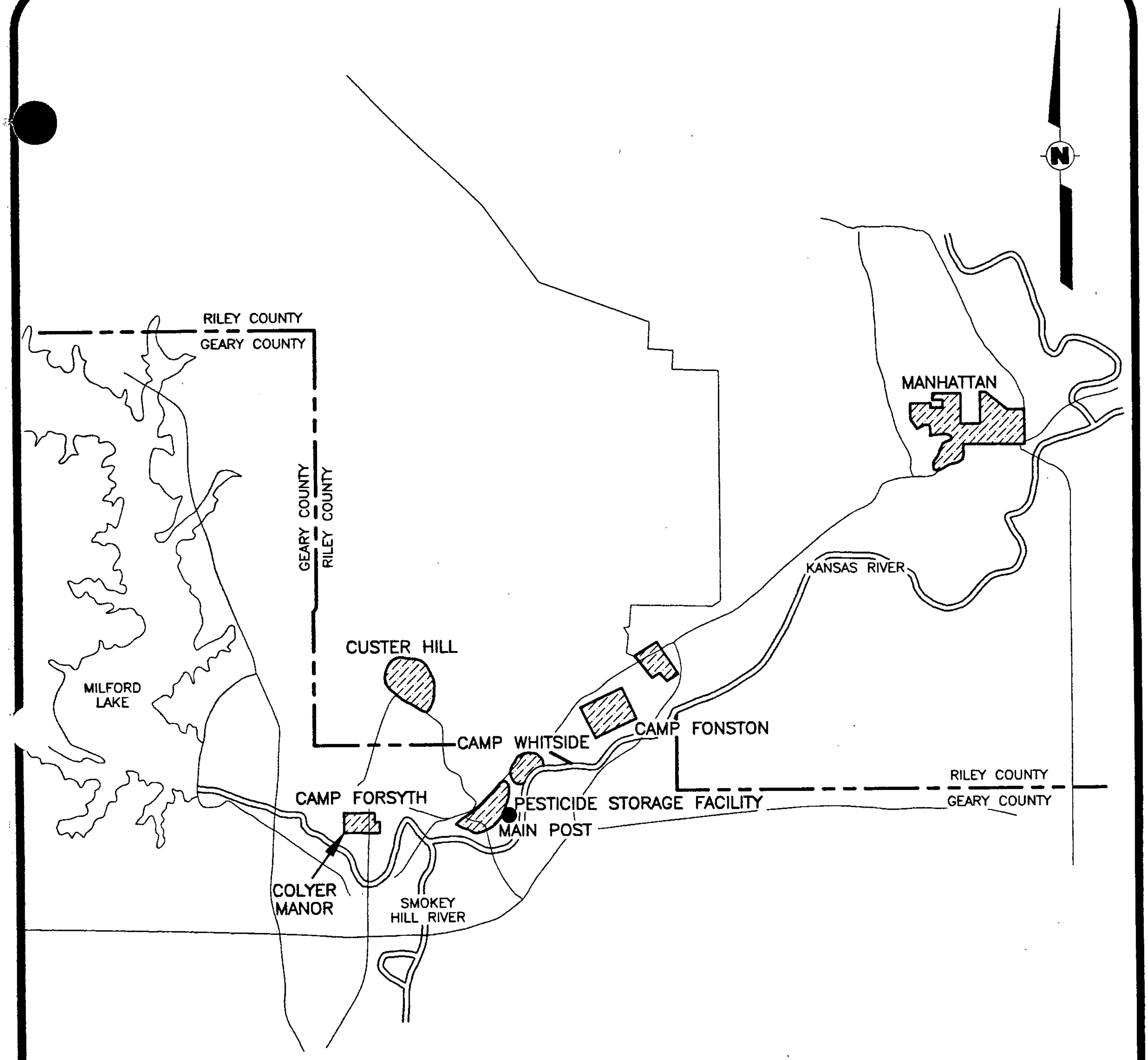
- The Directorate of Engineering and Housing's (DEH) Pesticide Storage Facility located on the main base (see Figure 1.2)

- The Coyler Manor housing area located at Camp Forsyth (see Figure 1.3)

1.2 DEH PESTICIDE STORAGE FACILITY SITE

The Pesticide Storage Facility (PSF) is located in the DEH equipment and supply storage yard located in the Main Post cantonment area of Fort Riley (see Figure 1.3). The surrounding area is primarily an industrial and administrative area, however, a military family housing area is located approximately 1/3 mile north of the site.

The PSF is an area adjacent to the north and east of Building 348, which has historically been used to store insecticides, herbicides, paint, and other maintenance supplies. Pesticide formulation and equipment rinsing occurred at the site. The site is located on a terrace and is partially within the 100-year floodplain of the Kansas River. A lined, intermittent drainage channel lies generally east of the site outside of a security fence which encompasses most of the site.



General Notes:

SCALE

0 3 6 MILES

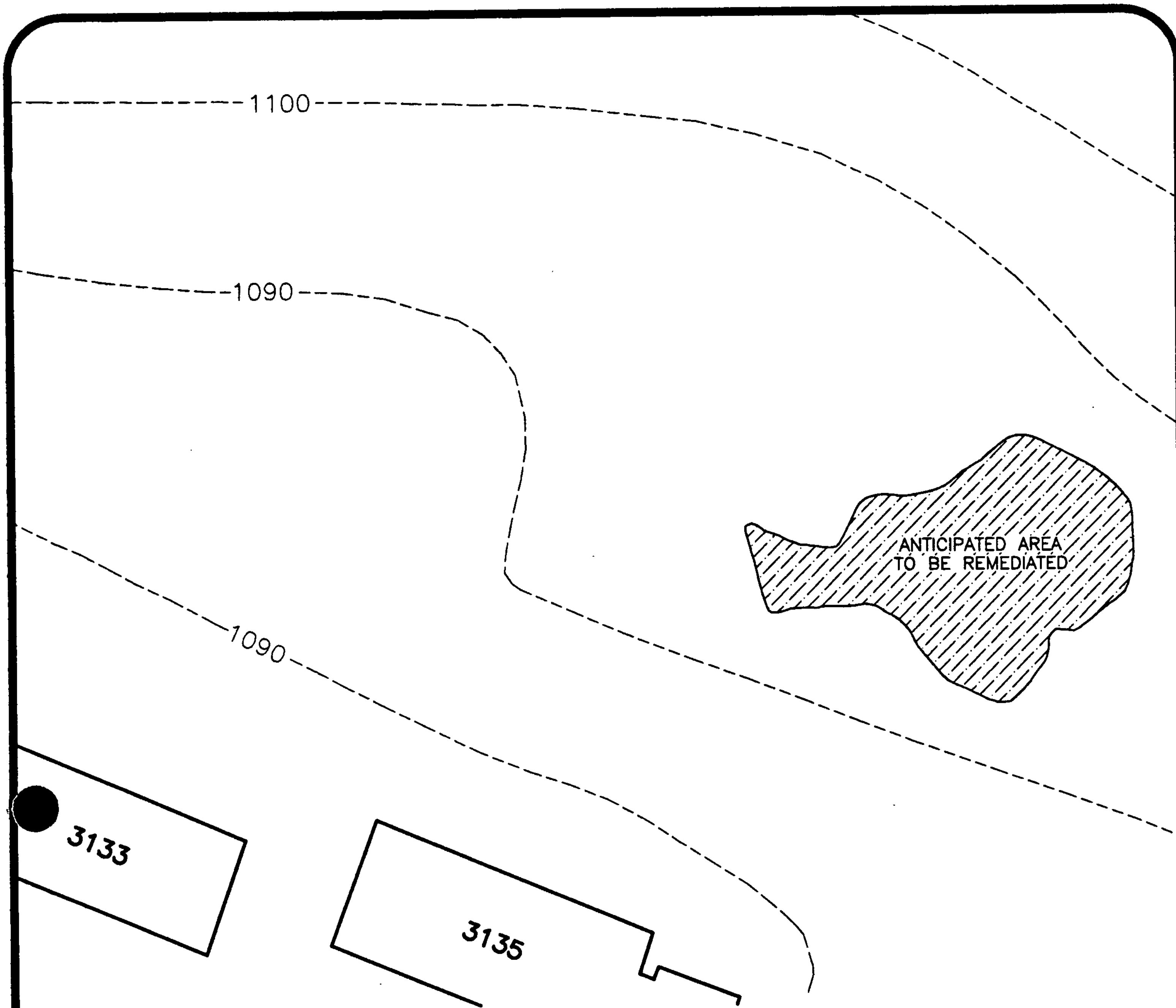
FIGURE 1.1

SITE MAP

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: APPROXIMATE	Drawing No: 15480-A1



General Notes:

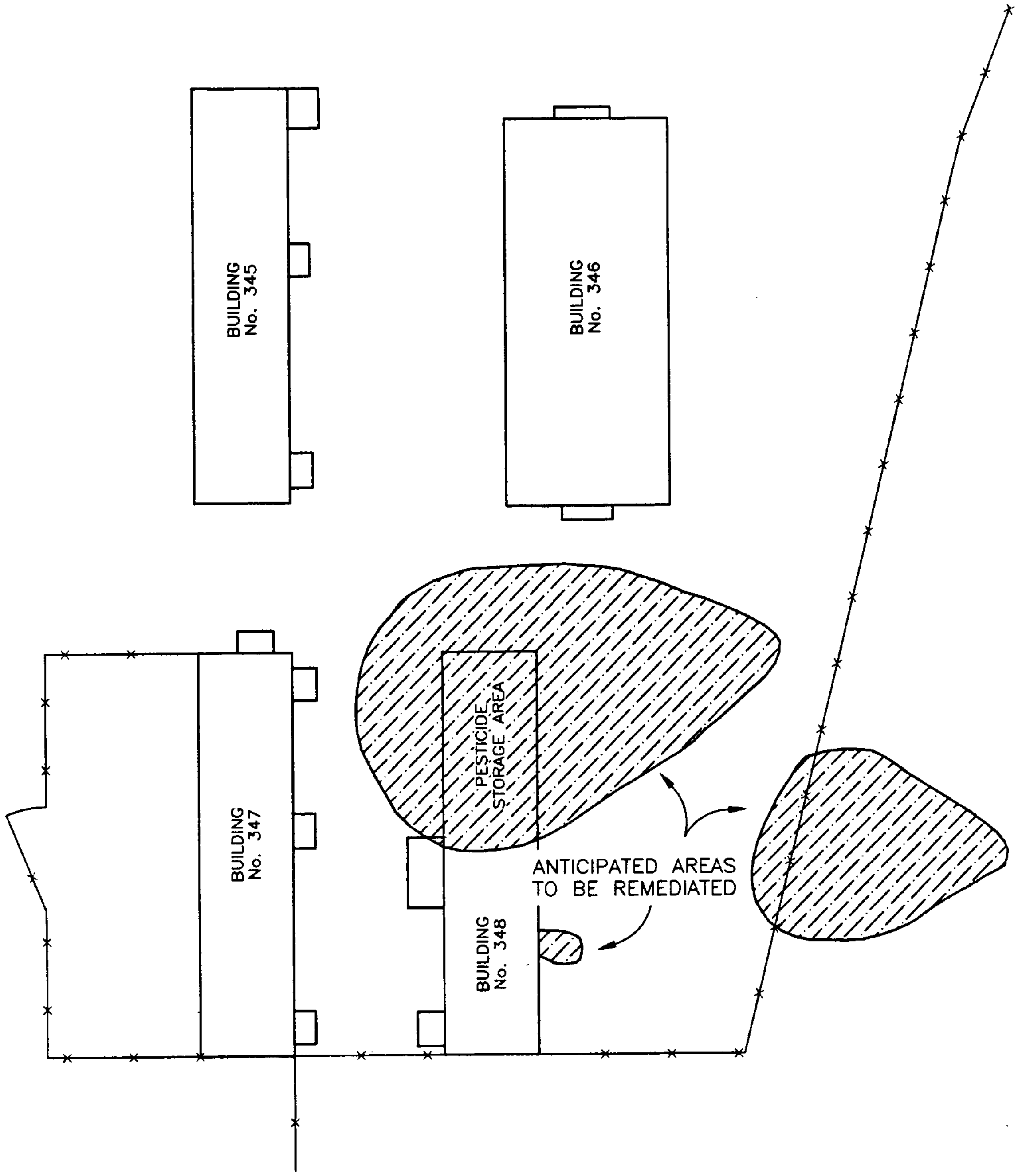
FIGURE 1.2

ANTICIPATED AREA TO BE REMEDIATED AT THE COYLER MANOR SITE

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: NONE	Drawing No: 15480-A3



General Notes:

FIGURE 1.3

ANTICIPATED AREAS TO BE REMEDIATED FOR THE PESTICIDE STORAGE FACILITY

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: NONE	Drawing No: 15480-A2

The PSF is known to have stored pesticides and herbicides (hereafter called "pesticides") since at least 1973. The pesticides stored in the facility were domestic type pesticides commonly available at the time. Prior to about 1975, pesticide wastewaters, rinse water, and concentrated spills were allowed to run on the ground surface east of the PSF. Since about 1976, the majority of pesticide applications have been performed by outside contractors to Fort Riley. Contractors are not allowed to use the PSF for information or the mixing of pesticides. Six inches of gravel was placed over the PSF area in 1986 to protect the site workers from contaminated soils.

Based on known past practices as well as soil samples analyzed for the PSF remedial investigation, pesticide contamination is known to exist around the PSF. The pesticides determined to be chemicals of concern are dieldrin, DDT, chlordane, and heptachlor. An area of arsenic-contaminated soil was identified outside the PSF perimeter fence. Polynuclear Aromatic Hydrocarbons (PAHs) were also detected in the soils; however, these appear to be a result of runoff from asphalt pavement and treated lumber and are not considered to be chemicals of concern requiring remediation. The total (in-place) volume of soils exceeding risk-based remediation levels is estimated to be less than 1,000 cubic yards.

The principal migration route for the PSF contamination is through soil erosion. Pesticides typically remain tightly bound to soil and do not readily leach; remedial investigation (RI) monitoring indicates that groundwater and surface waters have not been significantly impacted by PSF contaminant releases. With heavy rains there is potential for the contaminated soil to migrate to a nearby drainage ditch and continue to the Kansas River approximately 1/2 mile south of the PSF.

1.3 CAMP FORSYTH'S COYLER MANOR SITE

The Coyler Manor Housing area houses non-commissioned officers (NCOs) and enlisted soldiers and their families. The housing area includes playgrounds and athletic fields for children to play on. The lead site is adjacent to and across a drainage swale from the backyard of Housing Unit 3135 near the base of the bluff of the Republican River valley, slightly north of Building 3135. The contaminated area is typically mowed twice per year and is overgrown with dense, knee-high and taller vegetation. The Coyler Manor Family Housing area is located in the northeast portion of the Camp Forsyth cantonment area of Fort Riley.

The Sensitive-Receptor Lead Site-Coyler Manor area was identified as part of a larger investigation of the former Camp Forsyth Ranges, one of several groups categorized as high priority sites. Ranges may have existed in this area during and prior to World War I (WWI). The ranges were utilized during World War II (WWII) as small arms ranges, 30 caliber and smaller. These ranges extended along the bluffs from just west of Camp Forsyth to east of the Coyler Manor Housing area. The bluffs served as a backstop for the ranges and are believed to contain lead from the bullets fired at targets along the bluff area. The soils along the bluff area have been reworked for various nearby construction projects. Because of residential land use, the area was identified as an area of potential concern.

Based on the knowledge of former rifle ranges in the area and the suspected relocation of the nearby soils for construction purposes, Fort Riley suspected potential metals contamination in the soils. Sampling performed over the potentially impacted area identified contamination in a limited area near Building 3135. Lead concentrations ranging up to 1,700 milligrams per kilogram (mg/kg) of lead were found in this area. This exceeds the soil cleanup level of 500 mg/kg, considered protective for direct contact at residential settings (OWE Directive 9355.4.-02).

Exposure could occur during a disturbance of the vegetation and soils. The primary migration route for the contamination is through soil erosion. Additionally, lead may potentially migrate to groundwater by leaching. However, there is no evidence that migration is currently occurring. No other migration routes have been identified.

2.0 PROJECT OBJECTIVES

2.1 PESTICIDE STORAGE FACILITY

The objective of this field effort is to excavate the contaminated soils around Building 348. Investigative sampling was performed by Law Environmental (Draft RI Report, July 1993). Based on this study, the areas of excavation have been generally defined. OHM will collect 20 precharacterization samples on a 20-foot grid (plus five samples at a depth of 4.5 to 5 feet) for analysis by SW-846 Method 8080 to define the pesticide contamination. Seven-day laboratory turnaround time will be requested. An extra sample will be collected at each grid point for a composite sample for disposal analysis and profiling activities. Based on the precharacterization sampling results, OHM will excavate and dispose of the contaminated soils. Confirmation samples will be collected to verify that removal of the contamination is complete.

2.1.1 Cleanup Objectives

The Action Memorandum provided by Fort Riley provides action level for various contaminants. The following listed levels will be used for the clean-up criteria at this site:

- Chlordane 0.17 parts per million (ppm)
- DDT 0.66 ppm
- Dieldrin 0.014 ppm
- Heptachlor 0.050 ppm

2.1.2 Data Required to Meet the Project Objectives

The type of data needed to meet the project objectives will be generated through soil samples. The analytical method required to meet the project objectives are Pesticides (3550/8080) with ECD detection. Confirmatory and investigative samples will be collected on a 20-foot grid and analyzed for target pesticides. An extra sample will be collected at each sample location for a composite for the potential waste disposal facilities during the precharacterization sampling effort.

Data Uses	
Precharacterization	Site characterization (horizontal and vertical limits of contamination)
Confirmation	Validation that removal objectives have been met (above stated action levels)

Analytical Level	
Precharacterization	I, II
Confirmation	I
Contaminants of Concern	
Precharacterization	Target pesticides
Confirmation	Target pesticides
Level of Concern	
Precharacterization	Stated action levels
Confirmation	Stated action levels
Required Detection Limits	
Precharacterization	5 to 50 microgram per kilogram (ug/kg) analyte dependent
Confirmation	5 to 50 ug/kg analyte dependent
Critical Samples	
Precharacterization	Two adjacent clean samples to define the horizontal extent of contamination
Confirmation	Any sample above the stated action levels

2.2 ARSENIC AREA

Five samples (plus one at 5 feet) will be collected for arsenic analysis on a 10-foot diameter from SB-10 for a 7-day laboratory turnaround time. Based on the results of the investigative study, OHM will excavate the contaminated area and dispose of the arsenic contaminated soil. Two confirmation samples will be collected to ensure that the contamination has been removed.

2.2.1 Background Sampling

In order to establish the naturally occurring background arsenic levels necessary to validate final remediation goals, OHM under the direction of the Kansas City District Geologist, will obtain 20 soil samples to be analyzed for arsenic at an off-site laboratory. At the request of Fort Riley, these samples will also be analyzed for beryllium, thallium, and nitrate.

2.2.2 Cleanup Objectives

The Action Memorandum provided by Fort Riley provides the action level for various contaminants. The following listed level will be used for the cleanup criteria at this site:

- Arsenic to background

2.2.3 Data Required to Meet the Project Objectives

The type of data needed to meet the project objectives will be generated through soil samples. The analytical methods required to meet the project objectives are arsenic (3050/7061), beryllium and thallium (3050/6010), and nitrate (5050/9200). An extra sample will be collected at each non-background sample location and added to the pesticide area composite for the potential waste disposal facilities during the precharacterization sampling effort.

Data Lists	
Precharacterization	Site characterization
Background	To establish remediation goal
Confirmation	To confirm remediation goal has been met
Analytical Level	
Precharacterization	I,II
Background	I
Confirmation	I
Contaminants of Concern	
Precharacterization	Arsenic
Background	Arsenic
	Beryllium
	Nitrate
Confirmation	Arsenic
Required Detection Limits (Arsenic)	
Precharacterization	50 ug/kg
Background	50 ug/kg
Confirmation	50 ug/kg

Critical Samples	
Precharacterization	Boundary samples from SB-10
	outward 10 feet
Background	Statistical viability of sample set
Confirmation	Any sample above background

2.3 COYLER MANOR HOUSING AREA

The objectives of this field effort are to excavate the contaminated soils in the pile behind the housing area and dispose of any contaminated materials. Investigative sampling was performed in June 1993. Based on this study, the areas of excavation have been generally defined. OHM will use off-site quick-turn analysis by ICP to assist in the removal of contaminated material. During precharacterization sampling, a composite will be created for disposal analysis and profiling activities.

2.3.1 Cleanup Objectives

The Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive) sets a removal action level of 500 mg/kg.

Data Uses	
Precharacterization	Site characterization (horizontal and vertical limits of contamination)
Confirmation	Validation that removal objectives have been met (500 mg/kg)
Analytical Level	
Precharacterization	I, II
Confirmation	I
Contaminants of Concern	
Precharacterization	Lead
Confirmation	Lead
Level of Concern	
Precharacterization	500 mg/kg
Confirmation	500 mg/kg

Required Detection Limits	
Precharacterization	100 mg/kg
Confirmation	100 mg/kg
Critical Samples	
Precharacterization	Two adjacent clean samples to define the horizontal extent of contamination
Confirmation	Any sample above 500 mg/kg

2.3.2 Investigative Sampling

In order to expedite the contaminated soil removal, OHM will perform investigative sampling on a 20-foot grid around the pre-determined contamination zone to determine the most probable excavation limits. In addition, five samples at the 4.5- to 5-foot level will be obtained at this time from within the contamination zone to better define the excavation depth limits. These samples will be submitted to OHM's subcontractor laboratory for lead analysis by ICP on a 7-day turnaround time.

2.3.4 Confirmation Sampling

The validation of removal goals will be accomplished by confirmatory sampling throughout the excavated area on a 20-foot grid. These samples will be submitted to OHM's local subcontractor laboratory for lead analysis by ICP on a 24- to 48-hour turnaround time.

2.4 DATA QUALITY OBJECTIVES

In order to provide the required data quality objectives data, both field and laboratory quality control (QC) will be performed. A summary of these functions is presented in Table 2.1.

TABLE 2.1

PROJECT SAMPLING OBJECTIVES

Parameter	No. of Field Samples	No. of Field Duplicates	No. of MS/MSDs (Lab)	Total Samples (Field)	QA Dups/Splits	QA MS/MSDs	Total QA Samples
Pesticide Storage Area							
Pesticides 8080	23	2	1*	25	2	*	2
Arsenic	5	1	1*	6	1	*	1
Lead Contaminated Soil							
Lead 6010	38	2	1*	40	2	*	2
Background Samples							
Arsenic	19	1	1*	20	1	*	1
Beryllium	19	1	1*	20	1	*	1
Thallium	19	1	1*	20	1	*	1
Nitrate	19	1	1*	20	1	*	1

*MS/MSDs are to be run at the rate of 1 per batch of 20 samples. MS/MSDs are to be run as per the method by the analytical laboratory at no cost to the government.

3.0 PROJECT ORGANIZATION

The project management organization is based on the specific project requirements. The project team members and their responsibilities are listed in Subsection 3.1 below.

The project manager is the primary focal point for control of the project activities. The project manager will be supported by the program management support team which will provide reviews, guidance, and technical advice on project execution issues. Members of this staff will be called on an "as-needed" basis to assist in smooth project execution. The project manager will be supported by a supervisory, health and safety, and quality assurance/quality control (QA/QC) staff to ensure that the project is safely executed in compliance with applicable laws, regulations, statutes, and industry codes.

3.1 PROJECT ORGANIZATION AND RESPONSIBILITIES

The responsibilities of the key members in the project organization are:

3.1.1 Project Manager, Phillip Connor

The project manager is responsible for the overall direction of this project which is executed under his supervision. The project manager provides the managerial administrative skills to ensure that resource allocations, planning, execution, and reporting meet contract requirements. The project manager is ultimately accountable for all work activities undertaken on this project. The individual responsibilities of the project manager can include, but are not limited to, the following:

- Selection of a resource manager
- Participation in project QA reviews
- General supervision of the project
- Approval, as required, of project-specific QA documents
- Approval of procurement documents
- Stopping work on a project if necessary because the project cannot be completed to the required quality levels, the schedule, or budget to permit successful completion
- Communication to the project staff of project-specific client and regulatory requirements

- Identification, documentation, and notification of the contracting officer and project staff of changes in the scope of work, regulatory requirements, or QA practices

3.1.2 Site Supervisor, Bill Fenwick

The site supervisor will be the on-site operational manager of the project and is responsible for its day-to-day execution. He is in charge of the on-site operational and technical staff. He is responsible for maintaining clear, effective, up-to-date communications with the contracting officer concerning project scoping and planning. Responsibilities include coordination of subcontractors, including their compliance with OHM policies and procedures and contractual requirements, implementing and maintaining all site-specific plans, and controlling cost and schedule aspects of all site activities. Some of the quality-related responsibilities for the site supervisor include:

- Notifying the project manager if the project cannot be completed or completed with regard to quality, schedule, or cost

- Determining that changes, revisions, and reworks are required of the work plan or CSAP

- Serving as the final reviewer prior to release of project information to the client

3.1.3 Health and Safety Officer, (to be assigned)

The health-and-safety officer will be primarily responsible for:

- Assessing the potential health and safety hazards at the site
- Developing/implementing site-specific health and safety plans
- Performing periodic safety audits

3.1.4 Manager, Field Analytical/Quality Assurance Officer, Guy Gallello

The QA officer will:

- Track validation data and ensure adherence to published guidelines

- Determine if the levels of QA are being met for the project

- Certify the level of QA that has been achieved during the generation of analytical data

- Participate in project QA reviews

- Implement QA/QC procedures
- Manage the inter-laboratory auditing program during field projects
- Assure the traceability of all standards to primary standards
- Have the authority to stop work if quality objectives are not being met

3.1.5 Sample Technicians, Jeff Wooley, to be assigned

The sample technicians will be responsible for:

- Carrying out all sampling in accordance to approved procedures and methodologies as defined in the CSAP
- Completing sampling logbooks, sampling forms, and chain-of-custody forms

3.2 SUBCONTRACTORS

The subcontractors for this project will be determined at a later date.

3.3 ANALYTICAL LABORATORIES

OHM has selected two USACE-approved laboratories to perform this work.

For the Confirmatory Lead Analysis at Coyler Manor, the selected laboratory is:

Continental Analytical Services
1804 Glendale Road
Salina, KS 67401-6675
913-827-1273
Contact: Gregory J. Greene

All other analyses will be performed at:

Great Lakes Analytical
1380 Busch Parkway
Buffalo Grove, IL 60089
708-808-7766
Contact: Gary Carbonari

4.0 FIELD ACTIVITIES

This section discusses the objectives, strategies, and methodologies associated with the removal activities at the DEH Yard and Coyler Manor Sites. Table 4.1 summarizes these sampling activities.

4.1 COYLER MANOR HOUSING AREA

The sampling activities to be performed for the lead removal activity at the Coyler Manor Site are as follows below.

4.1.1 Precharacterization Sampling

OHM will collect soil samples to confirm and delineate the horizonal and vertical extent of the lead contamination in the soil and generate samples for disposal analyses and waste profiling activities.

4.1.2 Confirmation Sampling

OHM will collect soil samples to confirm that soils contaminated with lead above 500 mg/kg have been successfully removed.

Precharacterization Sampling

Precharacterization sampling will take place prior to the removal activities and the collected soil samples will be analyzed for total lead. These samples will be taken on a 20-foot square grid (see Figure 4.1). Samples will be collected at the 0- to 1/2-foot depth and at depths of 1, 3, and 5 feet. These samples will be analyzed using USEPA Method SW-846 3050/6010, Inductively Coupled Plasma Emission Spectroscopy (ICP). The following strategies will be used in collecting the precharacterization samples:

- Establishment of a benchmark for construction of the grid
- Construction of the grid
- Collection of samples for analysis for total lead levels
- Compositing of precharacterization samples to create disposal sample and waste profile sample activities

TABLE 4.1

OBJECTIVES, STRATEGIES, AND METHODOLOGIES OF SAMPLING

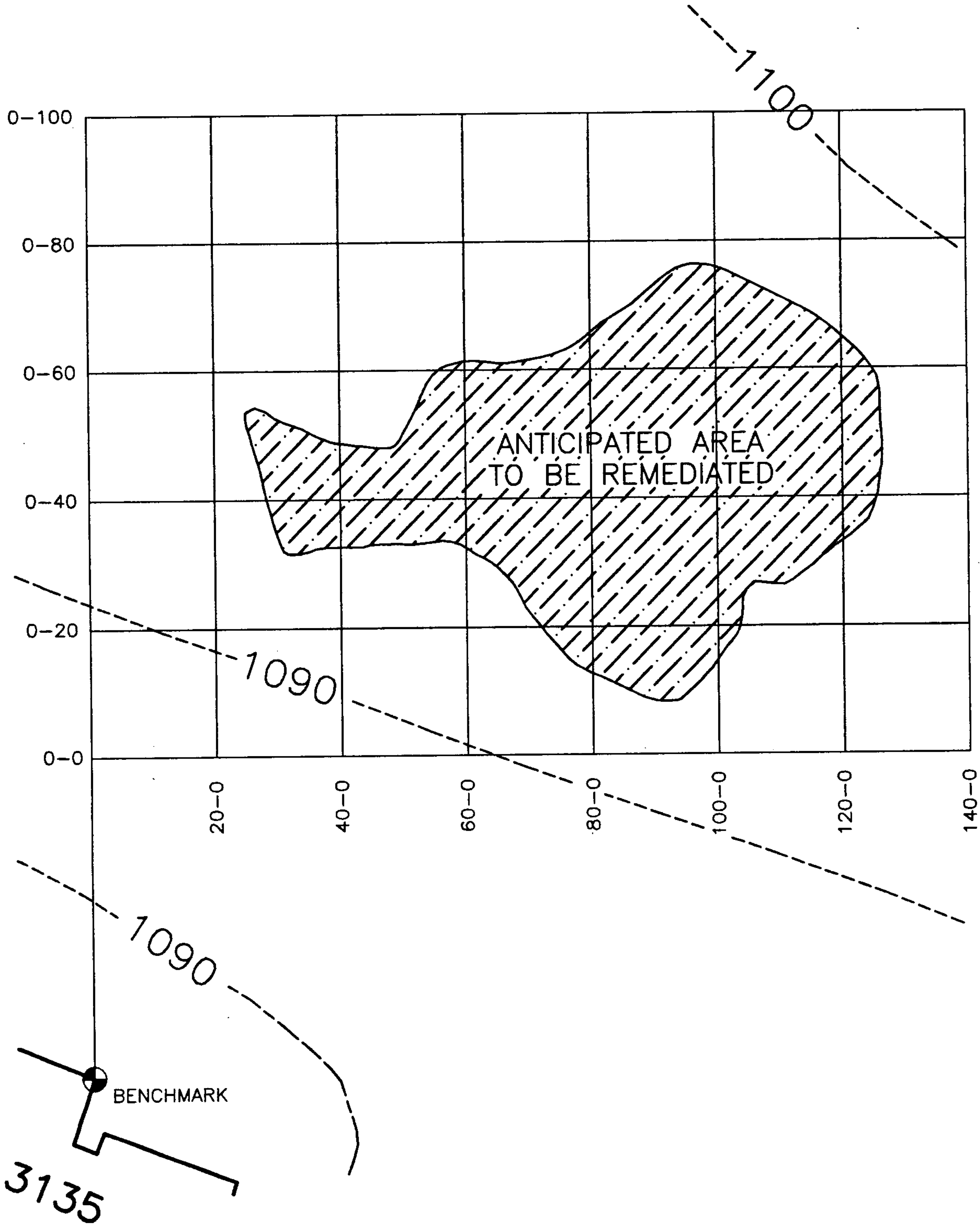
Objective	Strategy	Methodology	No. of Samples	Container and Volume	Analysis	Preservation	Sampling Location
Sampling will be used to accomplish the following at the Coyler Manor site:		All samples will be collected using hand or power tools suitable for the task (i.e., spatulas, small shovels, trowels and power auger, etc.)					
1. Precharacterization of the soils and delineation/confirmation of the extent of the lead contamination	1. Grid sampling using 20-foot grid		1. 38 + 2*	1. 32-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	1. SW-846 Methods 3050/6010	1. Cool to 4 degrees Celsius, package and ship to selected laboratory	1. See text and Figure 4.1 for sampling points
2. Confirmation sampling to verify removal of contaminated soil	2. Grid sampling using a 20-foot grid		2. 5 + 1* plus 2 MRD QA samples	2. 8-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	2. As above	2. Cool to 4 degrees Celsius, package and ship to selected laboratory	2. See text and Figure 4.1 for sampling points
3. Disposal sampling of soils	3. N/A		3. 3 + 1*	3. 32-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	3. Disposal analysis	3. Cool to 4 degrees Celsius, package and ship to selected laboratory	3. Samples will consist of composites of precharacterization samples
Sampling will be used to accomplish the following at DEH Yard location:							
1. Precharacterization of the soils and additional delineation of the extent of soil contamination	1. Grid sampling using a 20-foot grid		1. 23 + 2*	1. 32-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	1. SW-846 Method 8080	1. Cool to 4 degrees Celsius, package and ship to selected laboratory	1. See text and Figure 4.2
2. Additional delineation of the extent of arsenic contamination in the soil	2. Sampling on a 10-foot radius around sample point soil boring SB-10		2. 5 + 1*	2. 32-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	2. SW-846 Method 7061	2. Cool to 4 degrees Celsius, package and ship to selected laboratory	2. See text and Figure 4.2

TABLE 4.1

OBJECTIVES, STRATEGIES, AND METHODOLOGIES OF SAMPLING

Objective	Strategy	Methodology	No. of Samples	Container and Volume	Analysis	Preservation	Sampling Location
3. Confirmation samples to verify cleanup	3. Grid sampling using a 20-foot grid		3. 6 + 1* plus 2 from near former soil boring SB-10 location plus 2 MRD QA samples	3. 8-ounce glass with Teflon-lined lid; precleaned to USEPA protocols	3. SW-846 Methods 8080 and 7061 for arsenic area samples	3. Cool to 4 degrees Celsius, package and ship to selected laboratory	3. See text and Figure 4.2
4. Disposal sampling of soils	4. N/A		4. 3 + 1*	4. 32-ounce glass with Teflon-lined lid; precleaned to USEPA protocols	4. Disposal analysis	4. Cool to 4 degrees Celsius, package and ship to selected laboratory	4. See text and Figure 4.2
5. Disposal sampling PPE	5. Grab		5. 1	5. 32-ounce glass with Teflon-lined lid; precleaned to USEPA protocols	5. Disposal analysis	5. Cool to 4 degrees Celsius, package and ship to selected laboratory	5. PPE container
6. Disposal waste fluids	6. Grab		6. 1	6. 32-ounce glass with Teflon-lined lid; p[recleaned to USEPA protocols	6. Disposal analysis	6. Cool to 4 degrees Celsius, package and ship to selected laboratory	6. Two 250 g poly tanks
7. Background sampling to determine Arsenic, Beryllium, Thallium, and Nitrate levels	7. Grid sampling using a 20-foot grid		7. 19 + 2*	7. 8-ounce, glass with Teflon-lined lid; precleaned to USEPA protocols	7. SW-846 Methods 7061, 3050/6010 Spec. Nitrate	7. Cool to 4 degrees Celsius, package and ship to selected laboratory	7. See text. (Directed locations)

*Duplicate sample(s)



General Notes:

SCALE

0 25' 50 FEET

FIGURE 4.1
SAMPLE POINT LOCATIONS
COYLER MANOR SITE

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-25-94	Approved By:
Scale:	Drawing No: 15480-A4

Establishing a Benchmark

A corner of Building 3135 in Coyler Manor will be the benchmark location (see Figure 4.1). A line will be extended due north from this point for 50 feet. At this 50-foot point, a secondary benchmark will be established. This secondary benchmark will be designated as Grid Point 0-0 of the X-Y grid to be established for this site.

Grid Construction

The grid will have an X base line extending for 140 feet due east from grid point 0-0. A Y base line will extend for 100 feet due north from grid point 0-0. Both base lines will be marked in 20-foot intervals (see Figure 4.1). Each grid point will be described by two numbers. One grid point number will reference the Y base line, and one will reference the X base line. For instance, grid point 40-20 would be that point which is 40 feet east of grid point 0-0 and 20 feet north of grid point 0-0. The first number is the distance in feet due east from the Y base line and the second number is the distance in feet due north from the X base line.

Collection of Samples for Lead Analysis

Near Surface Samples

Twenty-three samples will be taken at the following grid points at depths of 0- to 1/2-foot below the surface. Two duplicate samples will be taken.

These grid points are as follows.

- 20-20, 20-40, 20-60, 40-20, 40-60, 40-80, 60-0, 60-20, 60-80, 80-0, 80-80, 100-0, 100-80, 120-0, 120-20, 120-80, 140-20, 140-40, and 140-60

The above samples are to confirm/delineate the outer limits of the contamination. The following grid points will be sampled to verify/confirm the high levels that are expected in the "hot area" of this site. Again, these will come from the 0- to 1/2-foot depth range.

- 60-40, 60-60, 80-60, and 120-60

At-Depth Soil Samples

The following five grid points will have samples taken at the 1-foot depth, at the 3-foot depth, and at the 5-foot depth from locations in the "hot area." Therefore, for each of these grid points, three distinct samples will be collected. The locations for these samples are as follows:

- 40-40, 80-20, 80-40, 100-60, and 120-40

The above samples will be used to help delineate the depths to which the lead contamination extends.

Compositing of Precharacterization Samples for Disposal Analysis

Samples collected from the "hot area" and from the 1-foot level in the "hot area" will be composited with mixing to form four equal composites that will each fill a 32-ounce jar. One of these samples will have disposal analysis parameters run on it, while the other three will be shipped to individual disposal facilities for evaluation purposes.

4.1.2 Confirmation Sampling

Confirmation samples will be taken from grid points located within the former "hot area" location. On-site personnel will take discretionary or as directed samples from selected grid points. These samples will be packaged and shipped from the site to the selected analytical laboratory. Samples to be sent to the USACE Missouri River Division (MRD) laboratory will be taken from selected grid points and shipped out after confirmation sample results have been obtained and evaluated.

4.2 DEH YARD - PSF BUILDING AREA

The sampling activities to be performed for the pesticide and arsenic removal activity at the DEH Yard Site are as follows below.

Precharacterization Sampling

OHM will collect soil samples to confirm and delineate the horizontal and vertical extent of the pesticide and arsenic contamination in the soil and generate samples for disposal analyses and waste profiling activities.

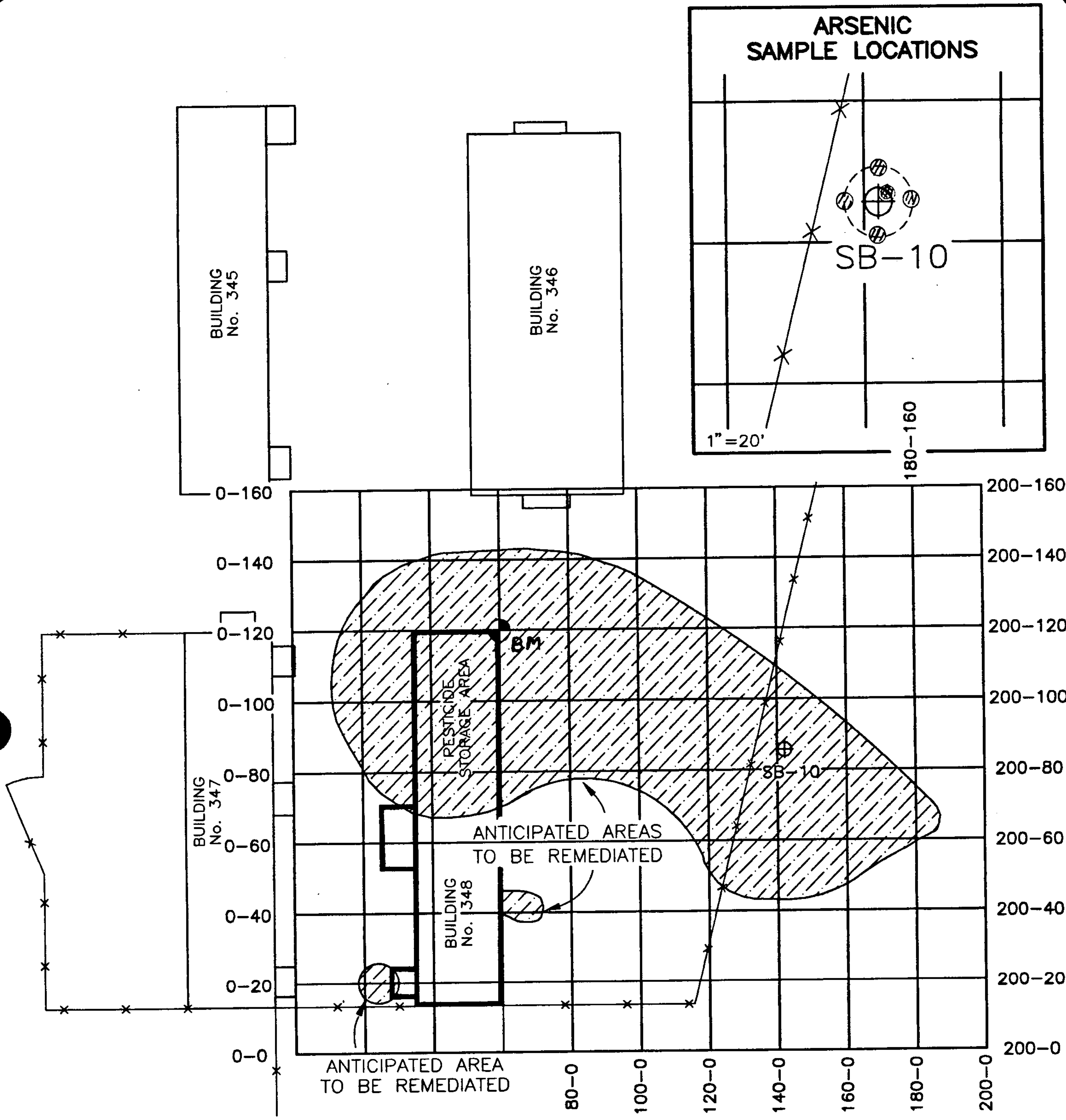
Confirmation Sampling

OHM will collect soil samples to confirm that soils contaminated with pesticides and arsenic above the cleanup levels have been successfully removed.

Precharacterization Sampling

Precharacterization sampling will take place prior to the removal activities and the collected soil samples will be analyzed for pesticides and arsenic. These samples will be taken on a 20-foot square grid (see Figure 4.2). Samples will be collected at the 1-foot depth and at a depth of 4.5 to 5 feet for selected grid points within the expected "hot area." These samples will be analyzed using USEPA Methods 8080 and 7061. The following strategies will be used in collecting these precharacterization samples:

- Establishment of a benchmark for construction of a sampling grid
- Construction of the grid



General Notes:

SCALE

0 40 80 FEET

FIGURE 4.2

SAMPLE POINT LOCATIONS
PESTICIDE STORAGE FACILITY

FORT RILEY, KANSAS

4-7

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale:	Drawing No: 15480-A2

- Collection of samples for analysis for pesticide and arsenic levels
- Compositing of precharacterization samples to create disposal samples and waste profile samples

Establishing a Benchmark and Grid Construction

A corner of Building 348 in the DEM Yard will be the benchmark location. See Figure 4.2 for the location of the benchmark. A line will be extended along the side of this building. This will be the 60-0/60-160 line of the Y base line. A second line will run parallel and even with the short end of Building 348. This will be the 0-120/200-120 line of the X base line.

All lines will be marked in 20-foot intervals (see Figure 4.2). Each grid point will be described by two numbers. One grid point number will reference the Y base line, and one will reference the X base line. For instance, grid point 40-20 would be the point which is 40 feet east of grid point 0-0 and 20 feet north of grid point 0-0. The first number is the distance in feet due east from the Y base line and the second number is the distance in feet due north from the X base line.

Collection of Samples for Pesticide and Arsenic Analysis

Near Surface Samples - Pesticides

Eighteen samples will be taken at the following grid points at depths of approximately 1 foot below the surface. Two duplicate samples will be collected.

These grid points are as follows.

- 0-100, 20-80, 40-140, 60-140, 60-40, 60-60, 80-80, 80-140, 100-60, 100-140, 120-40, 120-140, 140-40, 40-120, 160-40, 160-100, 180-60, and 180-80

At-Depth Samples - Pesticides

The following grid points will have samples taken at the 4.5- to 5.0-foot depths from locations in the "hot area." Therefore for each of these grid points one distinct sample will be collected. The locations for these samples are as follows.

- 40-120, 60-120, 80-120, 100-100, and 120-100

The above samples will be used to help delineate the depths to which the pesticide contamination extends.

Near Surface Samples - Arsenic

Four equally spaced samples will be collected of the soil at a distance of 5 feet from former sample point SB-10 and at depths of 1 foot. Analysis will be by SW-846 Method 7061. One duplicate sample will be taken.

At-Depth Samples - Arsenic

One sample will be collected from close to the former soil sample point SB-10 location at a depth of 4.5 to 5.0 feet (see Figure 4.2 for sampling point locations). The sample will be analyzed for arsenic by USEPA SW-846, Method 7061.

Compositing of Precharacterization Samples for Disposal Analysis

Samples collected from the "hot area" at the 4.5- to 5.0-foot depth will be composited with mixing to form four equal composites that each will fill a 32-ounce jar. One of these samples will have disposal analysis parameters run on it, while the other three will be shipped to individual disposal facilities for evaluation purposes.

4.2.2 Confirmation Sampling

Confirmation samples will be taken from grid points located within the former "hot area" location and from two points close to the location of former sample point SB-10. These two samples will be run for arsenic only. On-site personnel will take discretionary or as directed samples from selected grid points. These samples will be packaged and shipped from the site to the selected analytical laboratory. Samples to be sent to the USACE MRD laboratory will be taken from selected grid points and shipped out after confirmation sample results have been obtained and evaluated.

4.3 DISPOSAL SAMPLING OF OPERATIONAL WASTESTREAMS

The personal protective equipment (PPE) and any excess waste liquids generated throughout site activities will be grab sampled and submitted for disposal analysis parameters.

5.0 DOCUMENTATION

OHM will maintain a strict documentation system for the tracking and identifying of samples. The documentation program will include at a minimum: procedures for labeling, completion of chain-of-custody documents, and permanently bound field sampling notebooks.

5.1 SAMPLE LABELING

Correct sample labeling and the corresponding notation of the sample identification numbers in the field logbook are necessary to prevent misidentification of samples. All sample labels will be completed legibly with waterproof indelible ink. The completed label will be affixed to the sample bottle and covered with clear tape. **All samples sent to the MRD Laboratory will need to have the following Project ID on the sample label "MRD LIMS # 2415."** All sample labels will include at a minimum the following information:

- Job Number
- Sample Number
- Date - Month, Day, and Year
- Time - Military time (1000, 1400, 2300)
- Sample - Description of sample (include matrix and point of sample)
- Analyte - Analysis which will be performed
- Taken By - Initials of person taking sample
- Witness - Initials of person witnessing or assisting in taking the sample

See Figure 5.1 for an example of an OHM sample label.

FIGURE 5.1

SAMPLE LABEL

JOB #:15480	SAMPLE #:15480-PS-20-20-A
DATE:6/20/94	TIME:1615
SAMPLE:Precharacterization Sample from Grid Location 20-20	
TAKEN BY: BW	
WITNESS: WP	

5.2 FIELD LOGS

OHM will record information from the site survey and sample collection activities in the sampler's field logbook. The log will be a diary of the sampler's activities and will contain the following standard columns:

- Sample Number
- Date: Date sample was obtained
- Time: Military time sample was obtained
- Description of Sample: Physical description of sample (e.g., clear red, organic/cloudy, aqueous/brown sludge, or light sandy soil)
- Location: Description of area sampled (abbreviated form if sampled twice or more--log explaining locations and abbreviations should be attached to or written in front of the logbook)
- Sampler's Initials: Persons obtaining sample (usually two, at least one witnessing if not involved in actual sampling task)
- Volume: Size of sample (8 ounce, 32 ounce, etc.)
- Analysis Required: The analysis required (or requested) for each sample
- Results: Will vary according to project requirements; should be stated in consistent units (ppm, ppb, etc.) when possible
- Chain-of-Custody Number: Chain-of-Custody number for the Chain-of-Custody that relinquishes custody of a particular sample
- Additional Comments: Space reserved for any other information concerning particular sample or special procedure or analysis

5.3 CHAIN OF CUSTODY

Chain of custody will be maintained for all samples collected during this project. It is very important that the information on the chain-of-custody record form match the information on the sample bottles. Chain-of-custody procedures will be in accordance with USEPA procedures. The chain-of-custody forms will be completed (see Figure 5.2), enclosed in a plastic ziplock bag, and taped to the underside of the lid of the shipping containers utilized.

Figure 5.2 Chain Of Custody Form

LAB COPY

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Form 0019
Field Technical Services
Rev. 08/89

134456

O.H. MATERIALS CORP. • P.O. BOX 551 • FINDLAY, OH 45839-0551 • 419-423-3526

PROJECT NAME: Ft. Riley	PROJECT LOCATION: Ft. Riley, Kansas
PROJ NO.: 15480	PROJECT CONTACT: Bill Fenwick
PROJECT TELEPHONE NO.: (111) 222 - 3333	
CLIENT'S REPRESENTATIVE: Kevin Burkett	PROJECT MANAGER/SUPERVISOR: Phil Connor

ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS): Total Pb 3050/6010

ITEM NO	SAMPLE NUMBER	DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	Total Pb 3050/6010	REMARKS
1	15480-PS-20-20A	6/20	1615		X	Soil PS-20-20-A Colyer Manor Site	1	X	
2									
3									
4									
5									
6									
7									
8									
9									
10									

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1	Bill Walters	Ron Smith	6/21	1000
2					
3					
4					

REMARKS

SAMPLER'S SIGNATURE: Bill Walters

5.4 SAMPLE NUMBERING

Each sample identification number includes a five-digit project code (OHM project number), an alpha code followed by the grid position identifier and a sampling sequence identification code. The project number for this phase of activity will be 15480.

All samples obtained during the course of this project will be identified by their grid position and by the alpha codes given below. The sample numbers will be recorded in a sample logbook. The first sample from each grid position will be labelled as A, the second sample from the same grid position will be labelled B, etc. Field sketches will include the sample points and dimensions to locate the sample points to the nearest foot.

Sample Type	Coyler Manor Alpha Code	DEH Yard Alpha Code
Background Soil Samples	BS	BSP
Excavation Confirmation Samples	EC	ECP
Soil Disposal Samples	DS	DSP
Precharacterization Samples	PS	PSP

Sampling Sequence Identification Code

A	First sample from grid location
B	Second sample from same grid location
C	Third sample from same grid location

6.0 SAMPLE PACKAGING AND HANDLING

Procedures for sample handling, packaging and documentation are presented in this section. The methodology used by OHM will follow all applicable USACE guidelines for sample packaging, shipping, and chain of custody.

6.1 SAMPLE PACKAGING AND HANDLING

The samples will be placed in appropriately labelled, pre-cleaned sample containers, and enclosed within two plastic ziplock bags. The bottom of the metal, or equivalent strength plastic shipping cooler will be lined with bubble pack material. A sufficient quantity of ice will then be placed on the bubble pack material to cover the bottom of the cooler. All ice utilized inside the cooler will be containerized within two plastic freezer bags of 1 quart or larger in size. All four sides of the cooler will then be lined with ice packs. Each sample container will be wrapped with bubble pack material to prevent breakage. The wrapped containers will then be placed in the space created from the placement of the ice. Any remaining void space will then be filled with bubble pack to prevent movement of the sample containers during transport. Once the samples are secured, ice will be placed on top of the sample containers, thereby completely surrounding the sample containers with ice packs. The remaining headspace in the cooler, if any, will then be filled with bubble pack. Precautions will be taken to assure that the sample labels remain intact and legible (see Figure 6.1).

Prior to the sealing of the cooler, an OHM Shipment Check List will be reviewed for completion. The check list is a tool utilized by OHM to standardize sample packaging procedures during field operations. An example of the list is supplied (see Figure 6.2).

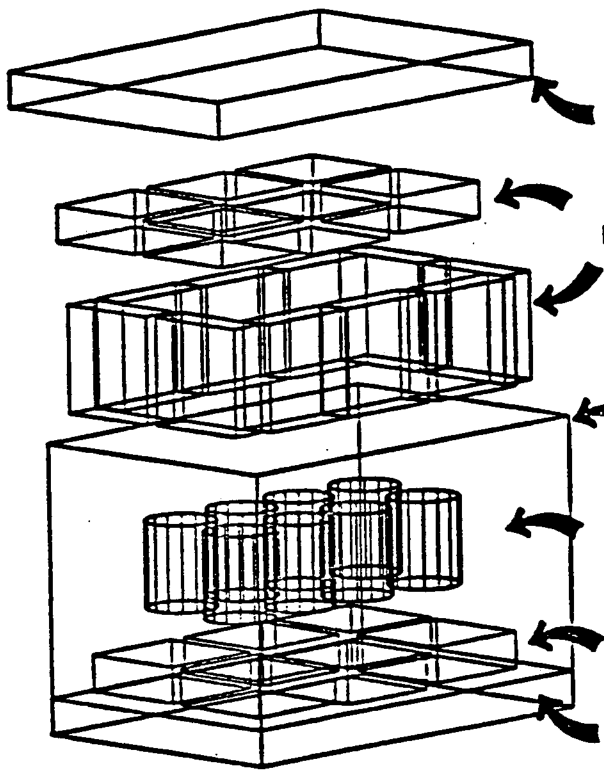
The completed chain-of-custody forms will be enclosed in plastic ziplock bags and taped to the underside of the lid of the cooler. The drain of the cooler will be taped shut. On the day of shipment, fresh ice will be added to the coolers to ensure the preservation criteria is met, the lid will be taped shut, and four custody seals or evidence tape will be fixed to the coolers. The coolers will then be shipped to the designated laboratory. For liquid samples a "THIS SIDE UP" placard is required.

Samples will sent to the selected laboratory for various turnaround times, so sample collection, shipping, and analytical processes are completed within the required maximum holding times (see Section 7.0, Analytical Methods). Samples taken for this project will be considered low-level environmental samples for packaging and shipping purposes. No samples will be held on site by OHM for more than 24 hours.

FIGURE 6.1

OHM Corporation

GUIDANCE FOR SAMPLE PACKAGING.



INSTRUCTIONS

Line the bottom of the cooler with absorbant material such as Sorbant Pods.
Place enough blue ice packs on the absorbant material to cover the bottom
Line all four side of the cooler with blue ice.
Place no more than eight 1-liter samples in the center of the blue ice.
Place sorbant material around the samples to avoid breakage.
Place enough blue ice packs to cover the top of the samples.
Fill the head space of the cooler with absorbant material.
Complete the OHM SHIPMENT CHECK LIST FORM prior to sealing cooler.
ICE MAY TO SUBSTITUTED FOR THE BLUE ICE BUT PRECAUTIONS MUST BE TAKEN TO ASSURE THAT THE SAMPLE LABELS REMAIN INTACT AND LEGIBLE.

FIGURE 6.2

OHM Corporation
SHIPMENT CHECK LIST

PROJECT NAME ______________ PROJECT No.: ______________

STREET ADDRESS ______________ DATE: / / TIME: ______

CITY/STATE/ZIP ______________

PHONE NUMBER ( ) - FAX NUMBER: ( ) -

SAMPLE CHECK LIST

	YES	NO	COMMENTS
SAMPLE LIDS ARE TIGHT AND CUSTODY SEALS IN PLACE?	☐	☐	
ARE ALL SAMPLE NUMBERS, DATES, TIMES AND OTHER LABEL INFORMATION LEGIBLE AND COMPLETE?	☐	☐	
HAS ALL SAMPLE NUMBERS, DATES, TIMES AND OTHER SAMPLING DATA BEEN LOGGED INTO THE SAMPLE LOG BOOK?	☐	☐	
DO SAMPLE NUMBERS AND SAMPLE DESCRIPTION ON THE LABELS MATCH WITH THOSE ON THE COC?	☐	☐	
HAVE THE SAMPLES BEEN PROPERLY PRESERVED?	☐	☐	
HAVE THE CHAIN OF CUSTODIES BEEN FILLED OUT COMPLETELY AND CORRECTLY?	☐	☐	
DOES THE ANALYLICAL SPECIFIED ON THE COC MATCH THE ANALYTICAL SPECIFIED IN THE SCOPE OF WORK?	☐	☐	
HAVE THE COC'S BEEN PROPERLY SIGNED IN THE TRANSFER SECTION?	☐	☐	

PACKAGING CHECK LIST

	YES	NO	COMMENTS
HAS EACH SAMPLE BEEN PLACED INTO AN INDIVIDUAL PLASTIC BAG?	☐	☐	
HAS THE DRAIN PLUG OF THE COOLER BEEN TAPED CLOSED WITH WATER PROOF TAPE FROM THE INSIDE?	☐	☐	
HAS THE BOTTOM OF THE COOLER BEEN LINED WITH AT LEAST THREE INCHES OF CUSHIONING ABSORBANT PADS?	☐	☐	
HAVE ALL SAMPLES BEEN PLACED INTO THE COOLER IN AN UPRIGHT POSITION?	☐	☐	
IS THERE ADEQUATE SPACING OF SAMPLES SO THAT THEY WILL NOT TOUCH DURING SHIPMENT?	☐	☐	
HAVE AN ADEQUATE NUMBER OF BLUE ICE PACKS BEEN PLACED AROUND AND ON TOP OF THE SAMPLES?	☐	☐	
HAS FRESH BLUE ICE BEEN ADDED TO THE COOLER THE DAY OF SHIPMENT?	☐	☐	
HAS THE COOLER BEEN FILLED WITH ADDITIONAL CUSHIONING MATERIAL?	☐	☐	
HAS THE COC BEEN PLACED IN A ZIPLOCK BAG AND TAPED TO THE INSIDE OF THE LID OF THE COOLER?	☐	☐	
HAVE CUSTODY SEALS BEEN PLACED ONTO THE LID?	☐	☐	
HAS THE COOLER BEEN LABLED "THIS SIDE UP"?	☐	☐	
HAS THE COOLER BEEN LABELED WITH THE DOT PROPER SHIPPING NAME, UN/NA NUMBER AND PLACARD?	☐	☐	
HAS THE LABORATORY PERFORMING THE ANALYSES BEEN NOTIFIED OF THE SHIPMENT OF SAMPLES?	☐	☐	

PROBLEMS/RESOLUTIONS:

PREPARED BY: SIGNATURE:

7.0 ANALYTICAL METHODS

The following sections detail the analytical methodologies that are to be utilized for the completion of the project goals. All methods are USEPA approved and will be followed in their entirety. The precision and accuracy goals of the OHM Subcontractor laboratories are contained in the quality assurance program plans (QAPPs) attached as Exhibit I to this document.

7.1 LABORATORY ANALYTICAL METHODS

7.1.1 Coyler Manor

Soils for Lead Analysis

Lead concentrations in both the precharacterization and confirmation samples will be determined with USEPA Methods 3050 and 6010, from *Test Methods for the Evaluation of Solid Wastes, Physical/Chemical Methods, SW-846 Third Edition.* Table 7.1 summarizes this analysis.

TABLE 7.1

LEAD ANALYSIS

Parameter	Desired Limit (Matrix Dependent)
Lead	100 mg/kg

7.1.2 Pesticide Storage Facility Excavation Analysis

Organochlorine Pesticides

Chlordane, DDT, dieldrin, and heptachlor will be analyzed by USEPA Method 8080. Due to the low detection levels needed, OHM will instruct its subcontractor laboratory to use ECD detection. Table 7.2 summarizes this information.

TABLE 7.2

ORGANOCHLORINE PESTICIDES

Parameter	Reference Method	CRDL (may be affected by matrix)
PESTICIDES		
Chlordane	SW-846 8080 ECD detection	50 ug/kg
DDT	SW-846 8080 ECD detection	50 ug/kg
Dieldrin	SW-846 8080 ECD detection	5.0 ug/kg
Heptachlor	SW-846 8080 ECD detection	5.0 ug/kg

7.1.3 Arsenic Area

Arsenic in Soils

The Arsenic levels in the background and confirmation samples will be determined by USEPA methods 3050 and 7061,"Arsenic by AA, Gaseous Hydride", *Test Methods for the Evaluation of Solid Wastes, Physical/Chemical Methods, SW-846 Third Edition.* Table 7.3 summarizes this analysis.

Beryllium and Thallium

Beryllium and Thallium will be determined in the background soils by USEPA Methods 3050 and 6010, *Test Methods for the Evaluation of Solid Wastes, Physical/Chemical Methods, SW-846 Third Edition.* Table 7.3 summarizes this analysis.

Nitrate in Background Soils

Nitrate will be determined by USEPA methods 5050/9200.

TABLE 7.3 ARSENIC ANALYSES		
Test Parameter	**Reference Method**	**Detection Limit**
CONVENTIONALS		
Nitrates	SW-846 5050/9200	5.0 mg/kg
METALS		
Arsenic	SW-846 3050/7061	50 ug/kg
Beryllium	SW-846 3050/6010	1.0 mg/kg
Thallium	SW-846 3050/6010	5.0 mg/kg

7.1.4 Disposal Analysis

Excavated soils/decontamination fluid mixtures and PPE will be analyzed for disposal purposes by approved USEPA and ASTM methods. OHM anticipates that landfill disposal testing will be required for this wastestream. In anticipation of the possibility of the waste failing to pass the landfill criteria, OHM will also add some additional test parameters to allow for the incineration of the wastes if needed. In case there is an excess of wastewaters on site, OHM will obtain a sample and test it for wastewater treatment parameters. The following tables are from OHM Midwest Region's Analytical Request Form (ARF) and detail the methods and detection levels necessary for these analyses.

TABLE 7.4

LANDFILL DISPOSAL ANALYSIS

Quantity	Matrix	Parameters	Method	Detection Limit
1	Solid/Soil	Physical Description (color, density)	Density - D1298 ASTM	NA
1	Solid/Soil	Moisture Content (% WT)		1%
1	Solid/Soil	Paint Filter test	SW-846 9095	NA
1	Solid/Soil	pH	SW-846 9045	NA
1	Solid/Soil	Reactive Cyanide	SW-846 9010	10
1	Solid/Soil	Reactive Sulfide	SW-846 9030	10
1	Solid/Soil	Flash Point	Sludge-SW-846 1010 Solid- SW-846 1020	
1	Solid/Soil	Total Cyanide	SW-846 9010	1.0 mg/Kg
1	Solid/Soil	Total Phenols	SW-846 9065	1.0 mg/Kg
		TCLP Tests	SW-846 1311	mg/L
1	Solid/Soil	Arsenic	SW-846 6010 7060 if conc <2x ICP IDL	0.5
1	Solid/Soil	Barium	SW-846 6010	0.5
1	Solid/Soil	Cadmium	SW-846 6010	0.5
1	Solid/Soil	Chromium (Total)	SW-846 6010	0.5
1	Solid/Soil	Copper	SW-846 6010	0.5
1	Solid/Soil	Lead	SW-846 6010 7421 if conc <2x ICP IDL	0.5
1	Solid/Soil	Mercury	SW-846 7471	0.05
1	Solid/Soil	Selenium	SW-846 6010 7740 if conc <2x ICP IDL	0.5
1	Solid/Soil	Silver	SW-846 6010	0.5
1	Solid/Soil	Zinc	SW-846 6010	0.5
		TCLP Organics	SW-846 1311	
1	Solid/Soil	Volatiles ZHE	SW-846 8240	mg/L

TABLE 7.4

LANDFILL DISPOSAL ANALYSIS

Quantity	Matrix	Parameters	Method	Detection Limit
1	Solid/Soil	Benzene	SW-846 8240	0.5
1	Solid/Soil	Carbon tetrachloride	SW-846 8240	0.5
1	Solid/Soil	Chlorobenzene	SW-846 8240	100
1	Solid/Soil	Chloroform	SW-846 8240	6
1	Solid/Soil	1,2-Dichloroethane	SW-846 8240	0.5
1	Solid/Soil	1,1-Dichloroethylene	SW-846 8240	0.7
1	Solid/Soil	Methyl Ethyl Ketone	SW-846 8240	200
1	Solid/Soil	Tetrachloroethylene	SW-846 8240	0.7
1	Solid/Soil	Trichloroethylene	SW-846 8240	0.5
1	Solid/Soil	Vinyl chloride	SW-846 8240	0.2
		Semivolatiles GCMS	SW-846 8270	mg/L
1	Solid/Soil	o-Cresol	SW-846 8270	200
1	Solid/Soil	m-Cresol	SW-846 8270	200
1	Solid/Soil	p-Cresol	SW-846 8270	200
1	Solid/Soil	Cresol (Total)	SW-846 8270	200
1	Solid/Soil	Pentachlorophenol	SW-846 8270	100
1	Solid/Soil	2,4,5-Trichlorophenol	SW-846 8270	400
1	Solid/Soil	2,3,6-Trichlorophenol	SW-846 8270	2
1	Solid/Soil	1,4-Dichlorobenzene	SW-846 8270	7.5
1	Solid/Soil	2,4-Dinitrotoluene	SW-846 8270	0.13
1	Solid/Soil	Hexachlorobenzene	SW-846 8270	0.13
1	Solid/Soil	Hexachlorobutadiene	SW-846 8270	0.5
1	Solid/Soil	Hexachloroethane	SW-846 8270	3
1	Solid/Soil	Nitrobenzene	SW-846 8270	2

TABLE 7.4

LANDFILL DISPOSAL ANALYSIS

Quantity	Matrix	Parameters	Method	Detection Limit
1	Solid/Soil	Pyridine	SW-846 8270	5
		Pesticides - GC	SW-846 8080	mg/L
1	Solid/Soil	Chlordane	SW-846 8080	0.03
1	Solid/Soil	Endrin	SW-846 8080	0.02
1	Solid/Soil	Heptachlor and epoxide	SW-846 8080	0.008
1	Solid/Soil	Lindane (γ-BHC)	SW-846 8080	0.4
1	Solid/Soil	Methoxychlor	SW-846 8080	10
1	Solid/Soil	Toxaphene	SW-846 8080	0.5
		Herbicides - GC	SW-846 8150	mg/L
1	Solid/Soil	2,4-D	SW-846 8150	10
1	Solid/Soil	2,4,5-TP (Silvex)	SW-846 8150	1
		Total Analyses		
1	Solid/Soil	Volatile Organics PP/HSL + TENT. ID include HOC list	SW-846 8240	10/50 mg/Kg
1	Solid/Soil	Semivolatile Organics PP/HSL +TENT.ID include HOC list	SW-846 8270	10/50 mg/Kg
1	Solid/Soil	Pesticides PP/HSL include Methoxychlor,Kepone,Isodrin	SW-846 8080	0.1/0.5 mg/Kg
1	Solid/Soil	PCB	SW-846 8080	0.5 mg/Kg
1	Solid/Soil	Herbicides (RCRA)	SW-846 8150	0.1 mg/Kg

TABLE 7.5

ADDITIONAL TESTING PARAMETERS FOR DISPOSAL

Quantity	Matrix	Parameter	Method	Detection Limit
1	Soil/Solid	Ash Content	D482 ASTM	0.1 %
1	Soil/Solid	BTU Content	D240 ASTM	200 BTU/lb
1	Soil/Solid	Total Organic Halides	SW-846 9022	0.1%
1	Soil/Solid	Total Sulfur Content	ASTM-E775-81, D129-64	0.1%
1	Soil/Solid	Metals, Total	SW-846, 7000, 6010	
1	Soil/Solid	Antimony	SW-846 6010	2.0 mg/L or mg/kg
1	Soil/Solid	Arsenic	SW-846 6010 7060 if conc <2x ICP IDL	5.0 mg/L or mg/kg
1	Soil/Solid	Barium	SW-846 6010	1.0 mg/L or mgkg
1	Soil/Solid	Beryllium	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Cadmium	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Chromium, Total	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Copper	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Iron	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Lead	SW-846 6010 7421 if conc <2x ICP IDL	2.0 mg/L or mg/kg
1	Soil/Solid	Manganese	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Mercury	SW-846 7471	0.2 mg/L or mg/kg
1	Soil/Solid	Molybdenum	SW-846 6010	5.0 mg/L or mg/kg
1	Soil/Solid	Nickel	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Potassium	SW-846 6010	10.0 mg/L or mg/kg

TABLE 7.5

ADDITIONAL TESTING PARAMETERS FOR DISPOSAL

Quantity	Matrix	Parameter	Method	Detection Limit
1	Soil/Solid	Selenium	SW-846 6010 7740 if conc <2x ICP IDL	1.0 mg/L or mg/kg
1	Soil/Solid	Silver	SW-846 6010	1.0 mg/L or mg/kg
1	Soil/Solid	Sodium	SW-846 6010	10.0 mg/L or mg/kg
1	Soil/Solid	Thallium	SW-846 6010	5.0 mg/L or mg/kg
1	Soil/Solid	Vanadium	SW-846 6010	5.0 mg/L or mg/kg
1	Soil/Solid	Zinc	SW-846 6010	1.0 mg/L or mg/kg

TABLE 7.6

WASTEWATER TREATMENT DISPOSAL ANALYSIS

Quantity	Matrix	Parameter	Reference Method	Detection Limit
1	Water/Soil	Physical Description (Color, Density)	ASTM D1298	NA
1	Water/Soil	Viscosity	ASTM D445, D2983	NA
1	Water/Soil	# of Phases,% volume of each phase, phase composition (S,SL,L)		NA
1	Water/Soil	Solids - Dissolved - Suspended - Total	EPA 160.1 EPA 160.2 EPA 160.3	10 mg/L 10 mg/L 10 mg/L
1	Water/Soil	Reactive Cyanide	SW-846 Section 7.3.3.2	10 mg/L
1	Water/Soil	Reactive Sulfide	SW-846 Section 7.3.4.1	10 mg/L
1	Water/Soil	pH Test	SW-846 9045	NA
1	Water/Soil	Alkalinity, Acidity	EPA 310.1(2),EPA 305.1	10 mg/L as $CaCO_3$
1	Water/Soil	Flash Point	SW-846 1010	NA
1	Water/Soil	Total Cyanides	SW-846 9010	1.0 mg/L
1	Water/Soil	Total Phenols	Sw-846 9065	1.0 mg/L
1	Water/Soil	Total Ammonia	EPA 350.2	10 mg/L
1	Water/Soil	Oxidizer Test	Screen/ Test Strip	+/-
1	Water/Soil	Peroxide Test	Screen/ Test Strip	5.0 mg/L
1		**Metals, Total**	SW-846 7000, 6010	
1	Water/Soil	Arsenic	SW-846 6010 7060 if conc <2x ICP IDL	0.5 mg/L
1	Water/Soil	Barium	SW-846 6010	0.5 mg/L
1	Water/Soil	Cadmium	SW-846 6010	0.5 mg/L
1	Water/Soil	Chromium (Total)	SW-846 6010	0.5 mg/L
1	Water/Soil	Chromium (Hexavalent)	SW-846 7195, 7196	0.5 mg/L
1	Water/Soil	Copper	SW-846 7210, 6010	0.5 mg/L

TABLE 7.6 WASTEWATER TREATMENT DISPOSAL ANALYSIS				
Quantity	Matrix	Parameter	Reference Method	Detection Limit
1	Water/Soil	Iron	SW-846 7380, 6010	0.5 mg/L
1	Water/Soil	Lead	SW-846 6010 7421 if conc <2x ICP IDL	0.5 mg/L
1	Water/Soil	Manganese	SW-846 6010	0.5 mg/L
1	Water/Soil	Mercury	SW-846 7471	0.05 mg/L
1	Water/Soil	Nickel	SW-846 6010	0.5 mg/L
1	Water/Soil	Selenium	SW-846 6010 7740 if conc <2x ICP IDL	0.5 mg/L
1	Water/Soil	Silver	SW-846 6010	0.5 mg/L
1	Water/Soil	Thallium	SW-846 6010	0.5 mg/L
1	Water/Soil	Zinc	SW-846 6010	0.5 mg/L
1	Water/Soil	Volatile Organics PP/HSL + TENT.I	SW-846 8240	0.1/1.0 mg/L
1	Water/Soil	Semivolatile Organics PP/HSL+TENT. ID	SW-846 8270	0.1/1.0 mg/L
1	Water/Soil	Pesticides PP/HSL inc. Methoxychlor	SW-846 8080	.005/0.1 mg/L
1	Water/Soil	PCB	SW-846 8080	0.5 mg/L
1	Water/Soil	Herbicides	SW-846 8150	
1	Water/Soil	2,4-D	SW-846 8150	0.1 mg/L
1	Water/Soil	2,4,5-T	SW-846 8150	0.1 mg/L
1	Water/Soil	2,4,5-TP (Silvex)	SE-846 8150	0.1 mg/L

8.0 CALIBRATION PROCEDURES

These sections outline the calibration procedures to be followed during the course of this project.

8.1 CALIBRATION OF FIELD INSTRUMENTATION

OHM field personnel will calibrate the field screening equipment according to the instrument manufacturer's instructions (see Table 8.1). All calibration information will be entered into the field instrument logbook. Calibration and/or checks of field instrumentation will be performed at least once per day during project operations or more often if circumstances dictate.

TABLE 8.1

FIELD INSTRUMENTS

Instrument	Manufacturer
HW-101 (portable PID)	HNU, Inc. (West Newton, MA)
MSA-360 (LEL/O_2)	MSA, Inc. (Pittsburgh, PA)

8.2 LABORATORY ANALYTICAL INSTRUMENTATION

OHM's subcontracted laboratories will follow the calibration protocols contained within the prescribed analytical methods being performed. The laboratory QAPPs attached to this document as Exhibit I contain a detailed discussion of the laboratory's procedures and policies regarding standard sourcing, standard preparation, and instrument calibration.

9.0 DECONTAMINATION PROCEDURES

Decontamination is accomplished to ensure that the contaminated materials which sampling equipment may have contacted in the exclusion zone are removed in the contamination reduction zone before passing into the support zone.

9.1 GENERAL

Disposable PPE will be treated as contaminated waste and drummed and staged accordingly. Personnel handling contaminated waste will wear Level C PPE. Washwaters and residues will be added to the soils and sent for off-site disposal.

9.2 SAMPLING EQUIPMENT

All sampling equipment and tools to the greatest extent possible will be disposable. All non-disposable sampling equipment used in obtaining samples should be precleaned and/or decontaminated by the following procedure:

- Wash with Alconox and water solution to remove all large particles
- Rinse with tap water
- Rinse with 10 percent nitric acid(only for samples collected for metal analytes)
- Rinse with deionized water
- Rinse with pesticide grade isopropanol (only for sample collected for pesticide analytes)
- Rinse with deionized water
- Air dry

9.3 SAMPLE CONTAINERS

Sample containers precleaned to USEPA protocols will be procured and used on this project. The certificates that accompany the precleaned jars will be retained as a part of the project records.

9.4 DECONTAMINATION WASTES GENERATED

Liquid waste generated during this project (i.e., washwater) will be added to the soils being shipped off site for disposal. OHM recognizes the need for generation of these wastestreams to be kept to a minimum throughout the project. Solid wastes shall be drummed and staged accordingly and disposed of in accordance with applicable state and federal regulations.

EXHIBIT I

LABORATORY QUALITY ASSURANCE PROGRAM PLANS

At the urging of USACE, OHM has selected a local laboratory, Continental Analytical Services in Silina, Kansas, to perform rapid turnaround for lead analysis for confirmation of Colyer Manor. OHM has made this selection based on the fact that Continental is in close proximity to Fort Riley and is Corps certified. OHM has initiated contacts with Continental concerning their membership in OHM's certified lab network. At the time of submittal of this Final CSAP, Continental's quality assurance documentation was not received by OHM. This information will be provided when received.

GREAT
LAKES
ANALYTICAL

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QUALITY ASSURANCE PROGRAM

Great Lakes Analytical
1380 Busch Parkway
Buffalo Grove, IL 60089

Revision: 3.1
Date: June 19, 1992

Signed

Kevin W. Keeley
Laboratory Director

1. INTRODUCTION

1.1 Definition

A Quality Assurance Program is an organization-wide network designed to ensure that data produced within that network conforms to the highest standards set by state and/or federal regulations. The network functions at the management level through company goals and management policies; it functions at the analytical level through standard operating procedures and quality control. These two levels are spanned by data control and the reviewing process. The end result is a data package that is accurate, reproducible, and is presented in such a way as to be most useful to the client.

1.2 Scope

Great Lakes Analytical analyzes thousands of environmental and industrial samples every month. Chemical and physical parameters must often be measured on the same sample. As such, the Quality Assurance Program must be able to accommodate the complications implicit in the analysis of many samples of widely varying matrices.

1.3 Purpose

The Quality Assurance Program provides a means by which the integrity of data can be verified. Because industrial, engineering, and environmental decisions are based on the data produced, it is essential that clear and extensive verification procedures exist. Accuracy, precision, completeness, and representativeness are all aspects of a data package that verify the integrity of the analysis.

The Quality Assurance Program is also a useful historical document. The chronological development of any Quality Assurance Program relies on the adequate documentation of previous programs. Improvements and modifications can be instituted only if an established frame of reference exists and the comparative efficacy of such changes can be judged.

Lastly, the Quality Assurance Program is the format through which Great Lakes Analytical can express its goals, policies, and commitment toward the generation of data of the highest quality. It expresses how the laboratory will meet those goals through time, resources, and personnel allocations.

1.4 Goals

Great Lakes Analytical is dedicated to the production of a broad range of high quality data at a reasonable cost and to providing a convenient service to our clients. As such, the company's organization, management policies, and routine activities are all designed to meet those goals.

2. ORGANIZATION AND RESPONSIBILITY

Great Lakes Analytical is structured to facilitate communications between the management and analytical levels and to ensure that the final data package produced for the client meets or exceeds regulatory standards. The following are brief descriptions of the major organizational levels (Figure 1 in Appendix).

2.1 Laboratory Director

The Laboratory Director is responsible for all aspects of laboratory operations. This includes the selection and promotion of staff, the purchase of equipment and instrumentation and the interpretation of analytical methods. The Laboratory Director is also responsible for the day to day operation of laboratory departments and overseeing the activities of individual analysts, as well as the implementation and review of the quality assurance program. The Quality Assurance Coordinator assists him in this latter function.

The Laboratory Director is responsible for all interactions with clients. This includes insuring that all client needs are met and setting appropriate priorities for analytical work. The Laboratory Director thoroughly reviews and signs all reports before they are released to the client.

The Laboratory Director also implements and oversees the Health and Safety program, and is assisted in this activity by the Health and Safety Coordinator.

2.2 Quality Assurance Coordinator

The Quality Assurance Coordinator is responsible for the implementation and review of the Quality Assurance Program, all quality control procedures, internal checks and audits, and Q.C. data reporting.

2.3 Health & Safety Coordinator

The Health and Safety Coordinator is responsible for implementing and overseeing the Health and Safety program. This includes routine internal health and safety audits of the facility as well as management of the Hazardous Waste Program. The Health and Safety Coordinator is also responsible for the implementation and overseeing of the Chemical Hygiene Program.

2.4 Sample Control Coordinator

The Sample Control Coordinator is responsible for the receiving and logging-in of samples delivered to Great Lakes Analytical. The Coordinator records the condition of the samples, and maintains a chain of custody and sample log-book. The Coordinator also ensures that samples have been preserved properly, have been delivered in the appropriate containers, have sufficient quantity for analysis, and are stored properly.

2.5 Analyst/Extraction Analyst

An analyst is responsible for all aspects of assigned analytical procedures, including overseeing sample preservation and preparation, performing the analysis, and reporting the results. Included in this is the adherence to all quality control procedures specified in the analytical method and the full documentation of these procedures. In addition, and analyst is responsible for routine maintenance of her or his equipment and for having sufficient supplies for analysis.

2.6 Technician

The technicians are responsible for both laboratory and field support. Under the supervision of the Laboratory Director, they are responsible for proper sample pick-ups, deliveries, and general laboratory support. In addition, they are responsible for bottle preparation in accordance with all quality assurance procedures.

3. CERTIFICATION

Great Lakes Analytical is certified by the State of California Department of Health Services under the Environmental Laboratory Accreditation Program (ELAP) for the analysis of drinking water, wastewater, and hazardous waste. The laboratory is also certified by the State of Wisconsin Department of Natural Resources under the Office of Technical Services, Laboratory Certification Program for the analysis of wastewater and hazardous waste. Our certificate numbers are:

1457	State of California, DHS, ELAP
9999-17-160	State of Wisconsin, DNR, OTS

3.1 Personnel Summary

Total Staff..23
Total Scientific Staff...............................18

3.2 Degrees

B.A./B.S..90%
M.S. 5%
PhD 5%

3.3 Undergraduate and Graduate Degrees Awarded

- Chemistry
- Biology

4. EQUIPMENT AND FACILITIES

Great Lakes Analytical's laboratory occupies a 3,400 square foot custom designed facility. Great Lakes is constantly upgrading its instrumentation capabilities. Major instruments and equipment include:

4.1 Organic Analysis

4.1.1 Gas Chromatography/Mass Spectroscopy (GC/MS)

(1) Hewlett-Packard 5971 Mass Selective Detector
Hewlett-Packard 5890 II Gas Chromatograph
RTX - 502.2 60 M Column for EPA Method 8240, 624, 8260
Tekmar LSC 2000 Purge and Trap
ALS 2016 Auto-Sampler & Auto-Sampler Heater
UNIX-Based Target Data Management System with Data Storage Tape Drive
Installed 8/91

(1) Hewlett-Packard 5971 Mass Selective Detector
Hewlett-Packard 5890 II Gas Chromatograph
DB625.MS 30 M X 0.25 um Column for EPA Method 8270
Hewlett-Packard 7673A Autosampler.
MS-DOS Instumentation Control Software
UNIX-Based Target Data Management System with Data Storage Tape Drive
Installed 9/91

4.1.2 Gas Chromatography

(1) Hewlett-Packard 5890 II Gas Chromatograph.
Uses Restek Rtx-502.2 105 M column for EPA 502.2, 8010, 8020, 8021, 601, and 602.
ELCD/PID Detectors.
2 Hewlett-Packard 3396 Integrators.
Tekmar LSC 2000 Purge and Trap.
Tekmar ALS 2016 Autosampler
Installed 8/90

(1) Hewlett-Packard 5890 II Gas Chromatograph.
Uses J&W DB5 0.32 mm X 30 M, and DB608 0.53 mm X 30 M columns.
ECD and FID Detectors for Method 8080 and 8015.
Hewlett-Packard 7673A Autosampler.
1 Hewlett-Packard 3396 II Data System.
Installed 10/90

(4.1.2 **Gas Chromatography Continued)**

(2) Hewlett-Packard 5890 II Gas Chromotograph
Uses DB5 0.53 mm X 30 M column
FID/PID Detectors for method 8020
2 Hewlett-Packard 3396II Integrators
Tekmar LSC 2000 Purge and Trap
Tekmar ALS 2016 Autosampler
Installed 11/91, 6/92

(1) Hewlett-Packard 5890 II Gas Chromotograph
Uses 2 DB5 0.32 mm X 30 M Column
ECD and FID Detectors for methods 8080 and 8015
Tekmar SHS 7000 Static Headspace Sampler
Tekmar SHS 7050 Auto Sampler
1 Hewlett-Packard 3396 II Integrators
Installed 11/91

4.1.3 High Performance Liquid Chromatography

(1) 712 WISP - Auto Sampler
501 HPLC Pumps (2)
680 Automated Gradient Controller with Reference Valve
486 Tunable Absorbance Detector
470 Scanning Flourescence Detector
2 Hewlett-Packard 3396 Intergrators
Retriver II Fraction Collector
Retriver II Diverter Valve
Envirogel GPC 19 X 300 Column for Method 3640
Envirogel GPC 19 X 150 Column for Method 3640
Supelcosil LC-PAH 25 cm x 4.6 mm Column for Method 8310
Installed 9/91

4.2 Inorganic Analysis

4.2.1 Atomic Absorption Spectrophotometers

(1) Varian SpectrAA-20 Atomic Absorbtion Spectrophotometer.
Varian VGA 76 Hydride Generator.
Citizen HSP-500 Printer.
Installed 9/90.

(4.2 Inorganic Analysis Continued)

(1) Varian SpectrAA-400 Atomic Absorbtion Spectrophotometer.
Zeeman Graphite Tube Atomizer.
IBM PS2 30286 Data System.
Varian 130286 software.
Varian PSD96Z Programmable sampling system.
Citizen HSP-500 Printer.
Installed 9/90.

4.2.2 General Chemistry Analysis

Spectronic 21 UV/Visible Spectrophotometer
Perkin-Elmer 283 Infrared Spectrophotometer
Mettler AT-250 Analytical Balance
Pensky-Martens Closed Cup Flash Point Tester
Cleveland Open Cup Flash Point Tester
YSI Model 35 Conductivity Meter
Fisher 925 pH/Ion meter
Ney M-525 muffle furnace
A10 Tekmar Laboratory Mill

4.3 Sample Preparation

Six-foot fume hood (4)
Heat Systems/Ultrasonics XL Sonicator
Millipore rotary extractor (2)
Millipore TCLP Zero Head Space Extractor (4)

4.3 Field Sampling Equipment

Isco 2910 Composite Sampler

4.5 Sample Storage

Freezer Storage: Approximately 60 cubic feet in 4 separate, lockable, and temperature-monitored freezers.
Refrigerated Storage: Approximately 195 cubic feet in 5 separate and temperature-monitored refrigerators.

Unrefrigerated Sample Storage: Approximately 290 square feet of shelving for sample storage

5. SAMPLING

Sampling is an important part of any analysis. The result may be only as useful as the quality of the sampling effort. While Great Lakes Analytical does not perform sampling for it's clients, it does provide sampling containers and advises clients if requested of proper sampling procedures, containers and preservation techniques.

5.1 Sampling Containers and Preservation

Containers are purchased in large lots from various commercial sources and are equivalent, in terms of construction materials and cleaning protocols, to those listed in the Federal Register, October 26, 1984 and SW-846 Revision 1 December 1987 (Figures 2a, 2b and 2c in Appendix). Containers are prepared in a designated area, labelled with the preservative added, affixed with a sample description label, and stored. Samples brought to Great Lakes by clients who have done their own sampling, are appropriately preserved and stored upon arrival. Preparation of containers is done by technicians relying on Standard Operating Procedures for Bottle Preservation. Bottles for organics analyses are purchased from suppliers who certify the containers to have been cleaned by protocols prescribed in the EPA methods for organics analyses. Sample containers are provided to clients with the appropriate preservatives as part of the analytical process.

6. CHAIN OF CUSTODY

The chain of custody is the documented history of any sample. It begins at the sample site with the sampling personnel and continues on with the sample through transport to the laboratory where it is received and stored under the custody of the laboratory. An example of Great Lakes Analytical's chain of custody may be found in Figure 3 in Appendix.

6.1 Laboratory Receipt Documentation

When the samples are received at the laboratory, the personnel in Sample Control check to ensure that all samples listed on the chain of custody are, in fact, present and in satisfactory condition. They sign and date the chain of custody form and store the samples appropriately in an area that is restricted to Great Lakes Analytical staff only.

In the case where samples are brought in by clients without a chain of custody form, Great Lakes will provide a blank form and then a copy of the completed, signed version of the form to the client.

6.2 Sample Integrity Documentation

In addition to ensuring that the sample is documented fully, the Sample Control personnel are responsible for determining if there is sufficient sample to do the analyses requested, that they are preserved appropriately, and that holding times have not been violated. They are also responsible for splitting those samples that have multiple analyses scheduled and for compositing.

Problems with sample integrity or paperwork inconsistencies are reported to the Lab Director who will take corrective action.

6.3 Sample Log-in

Upon being received at Great Lakes Analytical, each sample container is given a unique sample number and stored appropriately in cold storage or at room temperature in an orderly fashion to ensure that the analyst may quickly find the appropriate container for their analysis. Each of these unique sample numbers are entered in a bound logbook along with the client's name, the general analytical departments associated with the analytical requests, the turnaround status, and whether the sample is in acceptable condition or not. An example of a log-in form can be found in Figure 4 in Appendix.

6.4.1 Hazardous Samples

Hazardous samples are segregated from other samples in the lab and are segregated by hazard class. Hazardous samples are Red-Tagged with a strip of red tape on the top of the container. After analysis, the level of the contaminant must be shown on the outside of the container. The hazardous classes include Flammable, Asbestos, PCB's, Cyanides, and Acids. All hazardous samples are disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the premises.

6.5 Sample Storage

Samples are kept in house for 4-6 weeks after analysis unless special arrangements have been made by the client. Storage shelves are organized numerically in library fashion. The coolers are maintained at 4 degrees C. Monthly temperature records are kept for every cooler.

Analysts and technicians retrieve the sample container allocated to their analysis from storage, analyze the sample, and return it to the shelf from which it originally came. After 6 weeks of storage, samples are removed from the shelves and disposed of appropriately, unless otherwise specified by the client.

6.6 Sample Shipping

In the event that Great Lakes needs to ship samples, the samples are placed in a cooler with enough blue ice to ensure the maintenance of 4 degrees C. The samples are carefully surrounded by packing to avoid breakage and a trip blank is enclosed for those samples to be analyzed for volatile organics. The chain of custody is signed over to the courier and attached to the shipping paperwork. Samples are generally shipped overnight express or hand delivered by a Great Lakes Analytical courier to maintain sample integrity.

7. ANALYTICAL QUALITY CONTROL

Quality control measurements verify the integrity of the analytical results. While the goal of all quality control procedures remains constant, specific quality control procedures vary from method to method, and to some extent, with matrix type. Each analyst is responsible for a thorough understanding of the goals of the Quality Control Program, as well as how the program is implemented in each method. The analyst is also responsible for the documentation of all quality control measurements associated with a particular method. All documentation is kept in a bound notebook and securely stored for a minimum of 10 years.

Great Lakes Analytical adheres to the quality control procedures set out in EPA SW-846 Chapter 1, Revision 1, 1987 for the majority of analytical procedures. Great Lakes also adheres to any additional quality control procedures set out in a particular method. Other method references may include the California Title 22 Code, Illinois Title 35, Wisconsin Department of Natural Resources NR 149, Code of Federal Regulations 40, and Standard Methods, 17th Edition, 1989.

7.1 Calibration

7.1.1 Calibration for Organic Analyses

EPA Method 8000 from EPA SW-846, Revision 1, December 1987, is a general introduction to the quality control requirements for gas chromatography. It is followed by more specific methods developed for specific organic compounds. Great Lakes Analytical adheres to the quality control measures set out in EPA method 8000 for all organic analyses as well as any additional measures required by specific EPA methods. Standard operating procedures for the analytical methods and all quality control documentation measures are kept in the analysts' notebooks and reference binders.

The majority of organic instrumentation is calibrated with internal standards. Some instruments, because of the complex nature of the multipeak chromatograms produced by the method, necessitate the use of external standard calibration. Surrogate compounds are included in the calibration processes for most organic analyses as well.

Initially, each instrument is calibrated for the method for which it is allocated. Once the operating parameters have been established according to the method, the analyst prepares five standard solutions containing all the analytes of interest, any internal standards, and any surrogates that are appropriate for the method. These standard solutions are prepared at five different concentrations. One of the concentrations must be just above the detection limit and the other four should define the linear range for the instrument. All of the standard solutions are prepared using volumetric glassware and the highest quality solvents and stock standards commercially available.

Standards for instrument calibration are obtained from a variety of sources. Elemental standards are purchased from commercial suppliers, dated on receipt and replaced according to the methodology. A standards log is kept, containing date of receipt, supplier, lot #, concentration, any dilutions made, and a unique two digit code number to identify the standard (Figure 5 in Appendix). The documentation of the use of the standard is accompanied by the two digit code at every entry in the analyst's notebook.

The five standard solutions are introduced into the instrument in the same manner in which the sample or the sample extract would be introduced whether it be by purge and trap or by direct injection. The calibration factor (CF) for those methods that use external standards and the response factor (RF) for those methods that use internal standards are calculated. Calibration Factors and Response Factors are calculated as follows:

$$\text{Calibration Factor} = \frac{\text{Total Area of Peak}}{\text{Mass injected in Nanograms}}$$

$$\text{Response Factor} = \frac{(\text{Area of Analyte})(\text{Conc. of Internal Standard})}{(\text{Area of Internal Standard})(\text{Conc. of Analyte})}$$

The CF's or RF's for each of the five concentrations for each of the analytes, internal standards, and surrogates are tabulated. The five CF's or RF's for each analyte, internal standard, or surrogate should have a % Relative Standard Deviation (% RSD) of less than 20 %. The % Relative Standard Deviation is calculated as follows:

$$\%RSD = (SD/x) \times 100$$

Where

SD = Standard Deviation of initial 5 CF's or RF's for each compound.
x = Mean of initial 5 CF's or RF's for each compound.

If the % RSD is less than 20%, the calibration curve can be considered linear through the origin. If the % RSD is greater than 20%, additional calibration data must be collected or a calibration curve may in some cases be used. The CF's or RF's for each compound are graphed and all calculations are kept in the analysts' notebooks.

The initial calibration curve is further verified by the use of a dissimilar standard source. The analyst prepares a standard solution of a mid-range concentration in the same manner as the previous standard solutions were prepared with the exception that this solution is prepared from a different stock source than the original five solutions. The dissimilar source solution is introduced into the instrument in the same manner as the samples and the calibration solutions.

The CF or RF for the dissimilar source must be within 20% of the average CF or RF for that compound, calculated as follows:

$$\% \text{ Difference} = \frac{(\text{Average CF or RF}) - (\text{Dissimilar Source CF or RF}) \times 100}{(\text{Average CF or RF})}$$

The validity of the calibration curve must be checked daily for most instruments and more frequently for instruments with particularly sensitive detectors that tend to drift. The analyst prepares a daily calibration check standard solution in the same manner as the initial calibration standard solutions were prepared. The daily calibration check standard solution CF or RF must be within 20% of the average CF or RF of the calibration curve, calculated as follows:

$$\% \text{ Difference} = \frac{(\text{Average CF or RF}) - (\text{Calibration Check CF or RF}) \times 100}{(\text{Average CF or RF})}$$

Some methods have prescribed limits set for the calculations listed above that may be different. It should be noted that individual method specifications would override these general procedures. In addition, there may be calibration procedures prescribed in the method, like GC/MS tuning with BFB or DFTPP, that are not described here in detail but are described in detail in the standard operating procedures for the method.

7.1.2 Calibration for Inorganic Analyses

EPA Method 7000 from EPA SW-846, Revision 1, December 1987, is a general introduction to the quality control requirements for metals analysis. Great Lakes Analytical adheres to the quality control measures set out in EPA 7000 for inorganic analyses. Other quality control measures set out in the individual methods and in "Standard Methods for the Examination of Water and Wastewater" 17th Edition 1985 may also be included. Standard operating procedures for the analysis and the quality control documentation measures are kept in the analysts' notebooks and reference binders.

The majority of inorganic instrumentation is calibrated with external standards. The calibration procedures are much the same for inorganics as they are for organics. Please refer to section 7.1.1 above.

Because of the greater volume of environmental samples capable of being analyzed during a 24 hour period, inorganic calibration curves are checked on a more frequent basis. Every 20 environmental samples, a method blank, a calibration check standard, and a matrix spike and matrix spike duplicate are analyzed to continuously verify the quality of the analytical conditions.

7.2 Retention Time Windows

Most organic analyses use gas chromatography or liquid chromatography instrumentation. Some inorganic analyses use liquid chromatography instrumentation as well. As the key to analyte identification in chromatography, retention time windows must be established for every analyte in a particular method on every column used for that method. These records are kept with the notebooks associated with an instrument for later quantitation of the analytes.

Once the analyst has determined that the instrument is in optimum working order through calibration and calibration verification procedures, the analyst uses a mid-range calibration standard to establish the retention times for each of the individual analytes in a method. The analyst makes 3 injections of the same standard over a 72 hour period, tabulating the retention times for each analyte for each of the 3 injections. The standard deviation of the retention times is then calculated. The retention time window is defined as the average retention time $\pm$ 3 Standard Deviations.

7.3 Quantitation

Organic compounds analyzed by gas chromatography are tentatively identified by comparing retention times of the sample and the standard. Under most conditions, tentatively identified compounds must be confirmed on a second column of different affinity. Sample quantitation procedures are outlined in each method depending on the type of calibration used for the method. All calculations and instrumentation parameters are documented in the analysts' notebooks.

Similarly inorganic analytes are identified and quantitated by comparing the response of the analyte to the response of the standard. Confirmation is not always possible, although some methods, like metals analyses, allow for a secondary check under a different set of instrument operation parameters. Again, all calculation and instrument operating parameters are recorded in the analysts' notebooks.

7.4 Detection Limit Verification

The detection limit is determined for each analyte on each instrument allocated to a method on a yearly basis. The analyst prepares seven replicates of solution spiked at one to two times the reported detection limit with all the analytes of interest. Each of these aliquots is subjected to the entire analytical process. The standard Deviation (SD) of the seven replicates is calculated. The detection limit is calculated as follows:

$$\text{Detection Limit} = t_{(n-1,\ 1-a\ =\ 0.99)} \quad \text{X} \quad \text{SD}$$

where $t_{(n-1,\ 1-a\ =\ 0.99)}$ = 3.143 for seven replicates.

7.5 Equipment Maintenance

Great Lakes Analytical is dedicated to providing our clients with state-of-the-art technology. Instrumentation is purchased with sensitivity, accuracy, efficiency, and dependability as criteria. All instruments have log books in which calibrations, adjustments, routine maintenance, and any repairs are recorded. Calibrations, routine maintenance, and adjustments are part of the analysts' responsibilities. However, service contracts are in place for many of the instruments for any major repairs. The highest quality gases, reagents and spare parts are kept on hand to minimize repair time and optimize instrument performance.

Each entry in the instrument log book includes the date, the analyst, a detailed description of the problem, a detailed explanation of the solution, and a verification that the instrument is functioning properly. In addition, standard operation procedures for organic methods specify and require documentation of routine maintenance procedures like changing of septa in injection ports, changing of gas tanks, and cleaning of detectors.

7.6 Control Charts

The analytical process is controlled not only by instrument calibration as discussed above but by quality control measurements of the labor intensive portions of the analysis as well. These involve measurements of method blanks, accuracy and precision. Before any analytical batch is analyzed, a method blank, a spike, and a spike duplicate is analyzed to determine the quality of the analytical process.

7.6.1 Method Blank

The method blank must be free of contamination to determine that the extraction batch was free from contamination from an outside source and to prevent the overestimation of contaminants in the environmental samples. With the exception of a few compounds for a few analyses, the method blank should quantitate to a value of less than half the reported detection limit for the analytes of interest. The exceptions are enumerated in the specific standard operating procedures.

7.6.2 Accuracy

7.6.2.1 General Procedure

Accuracy measurements are performed every 20 samples or once every analytical batch per matrix type, whichever contains less samples. An environmental sample of the appropriate matrix for the analytical batch is spiked with a known quantity of the analyte(s) and analyzed in the same manner as the rest of the analytical batch. The % recovery is calculated and documented (Figure 6 in Appendix). Percent recovery is calculated as follows:

$$\% \text{ Recovery} = \frac{\text{Conc. of Matrix Spike - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

The % recovery of an analyte in a spiked sample must fall within the control limits set for that analyte. The control limits are defined as the average recovery of the most recent 20 spike samples $\pm$ 2 standard deviations. Some methods, however, have preset acceptance limits, in which case the limits set by the method are used.

7.6.2.2 Exceptions to Accuracy General Procedure

Specific projects or regulatory agencies may require accuracy measurements more stringent than those described above. In such cases the laboratory will operate at the higher level of quality assurance required. In no case will the laboratory perform at a level lower than that described in the general procedure.

7.6.2.2.1 Drinking Water Samples From the State of Illinois

Accuracy measurements are performed every 10 samples or once every analytical batch per matrix type, whichever contains less samples. With the exception of frequency, the procedure is exactly as described above in the general procedure.

7.6.3 Precision

7.6.3.2 Precision - General Procedure

Precision measurements are performed every 20 samples or once every analytical batch per matrix type, whichever contains less samples. A second aliquot from the environmental sample used in preparing the matrix spike above is spiked in the same manner to create a matrix spike duplicate. Both the matrix spike (MS) and the matrix spike duplicate (MSD) are analyzed in the same manner as rest of the analytical batch. The relative % difference between the two spiked duplicates is calculated and documented (Figure 6 in Appendix). The relative % difference is calculated as follows:

$$\text{Relative \% difference} = \frac{\text{Conc. of MS - Conc. of MSD}}{(\text{Conc. of MS + Conc. of MSD})/2} \times 100$$

The relative % difference for a particular analyte must fall within the control limit established for that analyte. The control limit is defined as the average of the relative % difference for the most recent 20 matrix spike, matrix spike duplicate pairs + 2 standard deviations. Some methods, however, have preset acceptance limits, in which case the limits set by the method are used. The standard deviation is calculated in the same manner as that calculated for the % recovery of the matrix spike.

7.6.3.2 Exceptions to Precision General Procedure

Specific projects or regulatory agencies may require precision measurements more stringent than those described above. In such cases the laboratory will operate at the higher level of quality assurance required. In no case will the laboratory perform at a level lower than that described in the general procedure.

7.6.3.2.1 Drinking Water Samples From the State of Illinois

Precision measurements are performed every 10 samples or once every analytical batch per matrix type, whichever contains less samples. With the exception of frequency, the procedure is exactly as described above in the general procedure.

7.6.4 Surrogates

In most organic analyses surrogate compounds are spiked into all environmental samples and into the matrix spike and the matrix spike duplicate. They act as a secondary check on both accuracy and precision in that their % recovery is documented and has control limits as well as ensuring that all environmental samples have gone through the analytical process with acceptably uniform recovery. The control limits for surrogate recovery are defined as the average recovery for the most recent 20 samples $\pm$ 3 standard deviations. The standard deviation is calculated in the same manner as that calculated for % recovery of the matrix spike.

7.6.5 Use of Control Charts

Control charts are updated every 20 entries (Figure 7 in Appendix). The calculations from the latest 20 entries define the control limits for the next 20 entries. As long as all the entries are within the control limits the analysis is considered in control. Because of the statistical derivation of the control limits, it is assumed that 1 in every 20 entries will be outside the control limits. When this occurs the analyst must recheck all calculations and verify that the instrumentation is calibrated properly with a calibration check standard. If all calibrations checks are verified, the deviation is attributed to matrix interference. However, any more than 1 entry outside the control limits requires a thorough examination of the entire analytical system to determine the source of the system error and to perform the corrective action. Any data belonging to the suspect entry's analytical batch should be reanalyzed.

7.7 Materials

Material purchased for use in the analytical process are all of the highest purity or quality commercially available. This includes all gases used in gas chromatography, all solvents, acids, and bases used in extraction or digestion, dilution, and standard preparation, stock standards, and any other routinely restocked items. On receipt of any of these items, the lot number from the manufacturer is recorded and the purity of the lot established through a method blank and or a calibration check.

7.8 Cleaning Procedures

The following is the general cleaning procedures used for most analytical glassware at Great Lakes Analytical.

1. Rinse with hot tap water.

2. Scrub with detergent.

3. Rinse 3 times with hot tap water.

4. Rinse with 1:1 hydrochloric acid.

5. Rinse 3 times with deionized water.

6. Air dry and store.

Specific EPA methods may require procedures that may vary from the cleaning procedures listed above. These specific cleaning procedures are posted in the glassware cleaning area and are kept on record with the appropriate analyst.

8. CORRECTIVE ACTION

A Quality Control Program must have corrective actions built into every standard operating procedure. The program is only as effective as the laboratory's ability to adhere to the program. If the level of acceptability set by the methodology is not met, corrective action must be taken immediately. In accordance with EPA SW-846 Chapter 1, Revision 1, December 1987, the following steps are taken to maintain the integrity of the final data package:

1. Identification and definition of the problem;

2. Assignment of responsibility for investigating the problem;

3. Investigation and determination of the cause of the problem;

4. Determination of a corrective action to eliminate the problem;

5. Assigning and accepting responsibility for implementing the corrective action;

6. Implementing the corrective action and evaluating its effectiveness; and

7. Verifying that the corrective action has eliminated the problem.

These steps apply to any and all standard operating procedures at Great Lakes Analytical (Figure 8 in Appendix). Corrective action forms are sent to the Lab Director and the Quality Assurance Coordinator for review and filing.

9. INTERNAL QUALITY CONTROL CHECKS

Each quarter, Great Lakes Analytical receives a series of blind reference samples for a variety of organic and inorganic analyses from a private vendor (APG). The analytes must be correctly identified and accurately quantitated. The results of these analyses are kept on file with the Quality Assurance Officer.

Clients are encouraged to submit quality control samples to Great Lakes and on request, arrangements will be made to split samples and subcontract to another laboratory as a confirmatory check.

In addition, a stock of performance evaluation samples are kept to be administered blind to the analyst at the discretion of the Quality Assurance Officer for more frequent internal performance checks.

10. INTERNAL AUDITS

Performance audits are done every quarter for every analyst. The quality assurance officer reviews the analyst's notebook for documentation of all quality control measurements, their frequency, and the clarity of the documentation (Figures 9a and 9b in Appendix). The notebook must be useful to any person who wishes to inspect the history of the analysis. Analysts must also have equipment logs, repair manuals, and adequate tools to keep instruments calibrated. The analyst's data reporting procedures are also reviewed to ensure that results can be easily traced to a notebook. The results of a system audit are discussed with the analyst and kept on file. If any discrepancies are noted, a follow-up audit is scheduled shortly thereafter.

11. DATA REDUCTION, VALIDATION, AND REPORTING

11.1 Data Review

Data travels through several processes before the final data package is released to the client. The path from the instrument response to the final report begins with the documentation of all testing parameters in the analyst's notebook. All calculations for the sample as well as the quality control measurements are also documented in the notebook. Once the analyst is satisfied that the analytical batch meets all quality control requirements and has quantitated the sample, the result is transferred to a set of laboratory worksheets specific to the client's requests on the chain of custody. When completed the worksheets are submitted to the Lab Director for review.

The Lab Director reviews the results, and checks that the analyses performed are appropriate to the client's requests. Related analyses from the same sample are compared for coherence, and the data is compared with previous results from the same source to observe any deviations from established trends. Unusually high results, or those clearly in violation of discharge limits or hazardous waste standards, are reviewed carefully for any reporting unit errors and frequently trigger an examination of the analyst's notebook and instrument printouts to check for calculation errors. Final review often involves further consultation with clients. After typing, the report is again reviewed by the Lab Director to ensure accurate transfer of information from the laboratory worksheets to the final report.

The laboratory director is responsible for the final review of the report, to which he adds his signature. Copies of final reports are kept in a secure filing area for a minimum of ten years and include the original laboratory worksheets and the chain of custody.

12. TRAINING

When reporting for work for the first time, all new employees receive a copy of the Personnel Policy Manual, the Chemical Hygiene Plan, a copy of the Health and Safety Manual, and a copy of the Quality Assurance Manual. These are his or hers to keep as part of his or her reference materials. The sole responsibility of the new employee is to read and understand the contents of these manuals. Once the new employee has read and understood the contents of the manual, he or she must sign a document that states that he or she agrees to adhere to the requirements prescribed therein. These records are kept on file with the Lab Director. Only then does further training take place.

The Personnel Policy Manual contains information about the company's history and objectives, administrative scheduling, benefits, and general administrative policies. The Chemical Hygiene Plan contains pertinent information about the chemicals to which employees may be exposed and how to properly interact with those chemicals. The Health and Safety Manual contains preventative procedures to avoid emergencies as well as procedures to cope with emergencies like spills, injuries and fire. The Quality Assurance Manual contains information about the goals of the Quality Assurance Program and their implementation.

Each new analyst receives a reference binder that includes copies of the methods for which he or she will be held responsible, all related extraction, cleanup, and dilution methods, analytical standard operating procedures, all relevant quality control documentation forms, standard operating procedures for filling out those forms, and procedures for troubleshooting and corrective action. The analyst must read and understand the contents of the binder and be able to answer questions to demonstrate that understanding. Additional verbal instruction from both the previous analyst and a quality assurance staff member is provided to ensure a working understanding of the requirements set out by the Quality Assurance Program Manual and the analytical methods.

The previous analyst then introduces the new analyst to all the instrumentation involved in his or her analyses. Standard operating procedures, preventative maintenance, and troubleshooting for the instrument are reviewed by both the previous and new analyst. The maintenance logbook is explained and any history specific to an instrument is reviewed by the previous and the new analyst.

Once the new analyst feels comfortable with all the documentation requirements and demonstrates an ability to operate the instrumentation satisfactorily, he or she will spend time observing the actual performance of the analysis by the previous analyst, gradually helping at various steps in the process in the presence of the previous analyst. Eventually, the new analyst will perform the entire analysis in the presence of the previous analyst to ensure adequate proficiency. Once the new analyst has demonstrated proficiency in the analytical procedures and has demonstrated the ability to maintain quality assurance documentation, he or she will submit results on a set of known and unknown internal quality control check samples. The results of these analyses are reviewed by the Quality Assurance Officer and an audit of the new analyst's books is performed by a member of the Quality Assurance staff. Records are kept on file with the Quality Assurance Officer.

Successful completion of the analyses of the known and unknown internal quality control check samples entails the submission of a value that is within the acceptable range established for that check sample by the EPA. A satisfactory audit entails documentation of all quality control parameters and documentation of any corrective action that may have been necessary. Pending the successful completion of the analyses of the internal quality control check samples and a successful audit, the new analyst assumes responsibility for the analysis. If the new analyst does not meet these requirements, he or she continues to work with the previous analyst until both requirements are passed successfully.

Once the new analyst has assumed responsibility for the analysis, routine review of data by the new analyst's supervisor continues as part of regular data review processes. Regular auditing by quality assurance staff members ensures continued compliance with Quality Assurance requirements.

13. GLOSSARY TERMS

ACCURACY:

The nearness of a result to the true value. It is the degree of agreement of a measurement, X, (or an average of measurements of the same thing), X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T) /T. Accuracy is a measure of the bias in the system.

ANALYTICAL BATCH:

The basic unit of quality control defined as similar matrix samples which are extracted and/or analyzed together with the same method sequence and the same lots of reagents and with the manipulation common to each sample within the same time period or in a continuous sequential time period.

AUDIT:

A systematic check to determine the quality of the laboratory operation. Audits may be of two basic types:

1) Performance Audits in which quantitative data are independently obtained for comparison with known true values.

2) System Audits of a qualitative nature that consist of an on-site review of the laboratories Quality Assurance Program and physical facilities for sampling, calibration and measurement.

BLANKS:

A blank is an artificial sample designed to monitor the introduction of artifacts into the process. For aqueous samples, reagent water is used as a blank matrix; however, a universal blank matrix does not exist for solid samples. The blank is taken through appropriate steps of the analytical process.

CALIBRATION BLANK:

An organic or aqueous solution that is as free of analytes as possible and prepared with the same volume of reagents used in the preparation of calibration standards. The calibration blank is used to give the null reading for the instrument response versus concentration calibration curve.

EQUIPMENT BLANK:

An organic-free aqueous solution that is opened in the field, poured appropriately over and through the sample collection devise, collected in a sample container and returned to the lab as a sample. Equipment blanks are a check of sampling devise cleanliness.

FIELD BLANK:

An organic-free aqueous solution that is transferred from one preserved vessel to another at the sampling site. This serves as a check on reagent and environmental contaminations.

REAGENT BLANK:

An organic or aqueous solution that is as free of analyte as possible and contains all the reagents in the same volume as used in the processing of the environmental samples. The reagent blank is carried through the complete preparation procedure and is used to correct for possible extraction procedure contamination.

TRIP BLANK:

An organic-free aqueous solution that is transported to the sampling site and returned to the laboratory without being opened to serve as a check on contamination originating from sample transport, shipping and site conditions.

COMPARABILITY:

An expression of confidence with which one data set can be related to another.

DATA QUALITY:

The totality of features and characteristics of data that bears on its ability to satisfy a given purpose. The characteristics of major importance are accuracy, precision, completeness, representativeness and comparability.

DATA VALIDATION:

A systematic process to review data to identify any outliers, omissions or suspect values to assure the validity of the data to the user. The screening process may be done by manual and or computer methods and utilize any consistent technique such as limits to screen impossible values or to analyze relationships between new and historical data sets.

ENVIRONMENTALLY RELATED MEASUREMENTS:

A term used to describe all field and laboratory investigations that generate data involving the measurement of chemical, physical or biological parameters of the environment; determining the presence or absence of priority pollutants in waste streams; health and ecological effect studies; clinical and epidemiological investigations; engineering and process evaluations; studies involving laboratory simulation of environmental events; and studies on pollutant transport including diffusion models.

MDL:

The Method Detection Limit is the minimum concentration of an analyte that can be measured and reported with 99% confidence that the value is greater than zero, as performed under ideal operating conditions.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE:

A technique used to provide a measure of accuracy for the method in a given matrix by adding predetermined quantities of analytes prior to sample extraction/digestion and analysis. The spike concentration should be at the regulatory level or near the PQL for the method. When performed in duplicate, the percent recovery and relative percent deviation between the MS and MSD is calculated and used to assess analytical precision.

PQL:

The Practical Quantitation Limit is the lowest level to be reliably detected within specified limits of precision and accuracy during routine laboratory operating conditions on environmental samples.

PERFORMANCE AUDIT:

The planned independent check of the operation of a measurement system to obtain a quantitative measure of the quality of the data generated by utilizing certified reference standards.

PRECISION:

The measure of mutual agreement between a set of replicate analyses for an analyte without assumption or knowledge of the true value. Precision can be expressed as standard deviation from a set of values or as relative percent difference from a duplicate sample.

QUALITY ASSURANCE:

The total integrated program for assuring the reliability of laboratory data including quality planning, quality assessment and quality improvement efforts to meet user requirements at an economical level. Quality Assurance incorporates procedures for field sampling, sample handling and storage, analytical quality control and document preparation and review.

QUALITY ASSURANCE PROJECT PLAN:

The orderly assembly of detailed and specific procedures by which the laboratory defines how it produces quality data for a specific project or method. The laboratory has one Quality Assurance Program but multiple Quality Assurance Project Plans for various analytical procedures.

QUALITY CONTROL:

The routine application of procedures such as blanks, spikes and spike duplicates for obtaining prescribed standards of performance in the measurement process.

RCRA:

The Resource Conservation and Recovery Act.

REAGENT GRADE:

Analytical Reagent (AR) Grade, ACS Reagent Grade and Reagent Grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REPRESENTATIVENESS:

The degree to which data accurately and precisely represents a characteristic population, parameter variations of a sampling point or an environmental condition.

SAMPLE:

A discreet representative part or a single item from a larger group presented to the laboratory for analysis.

DUPLICATE SAMPLE:

Two replicate aliquots taken from the same source for which determination of composition or contamination is requested or required.

REFERENCE SAMPLE:

A sample prepared from an independent standard that is intended as a check of techniques, methodology, equipment, and standards.

STANDARDS:

A known reference concentration of analyte to which environmental samples are compared.

CALIBRATION STANDARDS:

The graduated dilutions of stock analyte solutions prepared to establish the standard curve or calibration curve for a particular analyte.

CALIBRATION CHECK STANDARD:

The verification of instrument response by analyzing a standard prepared from a calibration standard. It is an evaluation of calibration performed concurrently with sample analysis.

STANDARD CURVE:

A graph of the calibration standard concentration versus instrument response for an analyte. The standard curve describes the linear quantitation range for an analyte. The concentration of analyte in an environmental sample can then be calculated from the response factor of the sample.

STANDARD OPERATING PROCEDURE (SOP):

An operation, analysis or action whose mechanics are thoroughly prescribed and documented and which is commonly accepted as the usual or normal method for performing certain routine or repetitive tasks.

SURROGATE:

Organic Compounds which are similar to analytes of interest in chemical composition, extraction and chromatography, but which are not normally found in environmental samples. These compounds are spiked into all blanks, standards and samples prior to analysis and percent recoveries are calculated.

SW-846:

The EPA document "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods".

WATER:

A reference to Reagent, Analyte-Free, Laboratory Pure or ASTM Type II water means any distilled or deionized water which is free of contaminants that may interfere with the analytical test.

APPENDIX

FIGURE 1

GREAT LAKES ANALYTICAL
ORGANIZATIONAL CHART

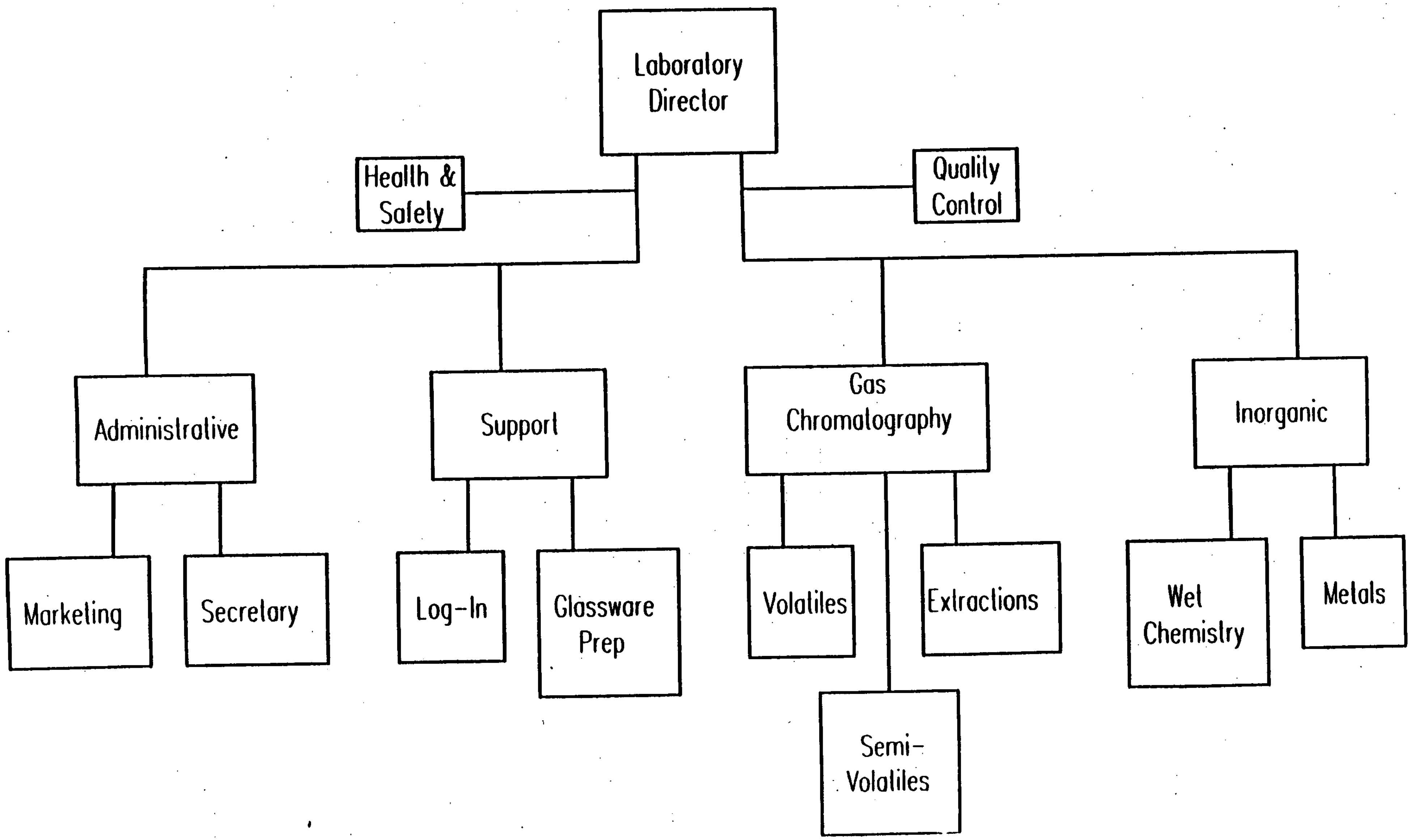

FIGURE 2A: Use for Drinking Water Samples

Parameter[a]	Preservative[b]	Container[c]	Maximum Holding Time[d]
Arsenic	Conc HNO_3 to pH less than 2[f]	P or G	6 months
Barium	Conc HNO_3 to pH less than 2	P or G	6 months
Cadmium	Conc HNO_3 to pH less than 2	P or G	6 months
Chromium	Conc HNO_3 to pH less than 2	P or G	6 months
Lead	Conc HNO_3 to pH less than 2	P or G	6 months
Mercury	Add 20 ml per liter of sample of a solution of 2.5% potassium dichromate in 1:1 HNO_3	G P	38 days 14 days
Nitrate	Conc H_2SO_4 to pH less than 2	P or G	14 days
Selenium	Conc HNO_3 to pH less than 2	P or G	6 months
Silver	Conc HNO_3 to pH less than 2	P or G	6 months
Fluoride	None	P or G	1 month
Chlorinated hydrocarbons	Refrigerate at 4°C as soon as possible after collection	G with foil or Teflon-lined cap	14 days[e]
Chlorophenoxys	Refrigerate at 4°C as soon as possible after collection	G with foil or Teflon-lined cap	7 days[e]
Cyanide	Add NaOH to pH greater than 12 refrigerate & keep in dark	P or G	24 hours
Trihalomethanes	0.008% $NA_2S_2O_3$ Refrigerate at 4°C as soon as possible after collection	G with foil or Teflon-lined cap	14 days
Alkalinity	Refigrate at 4°C as soon as possible after collection	P or G	14 days
Calcium	Conc HNO_3 to pH less than 2	P or G	6 months
Copper	Conc HNO_3 to pH less than 2	P or G	6 months
Hydrogen ion (pH)	None	P or G	2 hours
Iron	Conc HNO_3 to pH less than 2	P or G	6 months
Manganese	Conc HNO_3 to pH less than 2	P or G	6 months
Sodium	Conc HNO_3 to pH less than 2	P or G	6 months
Total dissolved (filterable) residue	Refrigerate at 4°C as soon possible after collection	P or G	14 days
Zinc	Conc HNO_3 to pH less than 2	P or G	6 months

NOTES:

a. If a laboratory has no control over these factors the laboratory director must reject any samples not meeting these criteria and so notify the authority requesting the analyses.

b. The following procedure shall be utilized if the concentrated acid specified for preservation cannot be used because of shipping restrictions: (1) the sample shall be initially preserved by icing and immediately shipped to the laboratory; (2) upon receipt in the laboratory, the sample shall be acidified with the concentrated acid specified for preservation to pH less than 2; and (3) at the time of analysis the sample container shall be thoroughly rinsed with a 1:1 solution of the same type of acid and water, with the washings being added to the sample.

c. P = Plastic, hard or soft; G = Glass, hard or soft.

d. In all cases, samples should be analyzed as soon after collection as possible.

e. Well-stoppered and refrigerated extracts can be held up to 30 days.

TABLE 2-16. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Name	Container[1]	Preservation	Maximum holding time
Bacterial Tests:			
Coliform, fecal and total	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Fecal streptococci	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Inorganic Tests:			
Acidity	P, G	Cool, 4°C	14 days
Alkalinity	P, G	Cool, 4°C	14 days
Ammonia	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Biochemical oxygen demand	P, G	Cool, 4°C	48 hours
Bromide	P, G	None required	28 days
Biochemical oxygen demand, carbonaceous	P, G	Cool, 4°C	48 hours
Chemical oxygen demand	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Chloride	P, G	None required	28 days
Chlorine, total residual	P, G	None required	Analyze immediately
Color	P, G	Cool, 4°C	48 hours
Cyanide, total and amenable to chlorination	P, G	Cool, 4°C, NaOH to pH>12, 0.6g ascorbic acid	14 days
Fluoride	P	None required	28 days
Hardness	P, G	HNO_3 to pH<2, H_2SO_4 to pH<2	6 months
Hydrogen ion (pH)	P, G	None required	Analyze immediately
Kjeldahl and organic nitrogen	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Metals:			
Chromium VI	P, G	Cool, 4°C	24 hours
Mercury	P, G	HNO_3 to pH<2	28 days
Metals, except chromium VI and mercury	P, G	HNO_3 to pH<2	6 months
Nitrate	P, G	Cool, 4°C	48 hours
Nitrate-nitrite	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Nitrite	P, G	Cool, 4°C	48 hours
Oil and grease	G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Organic carbon	P, G	Cool, 4°C, HCl or H_2SO_4 to pH<2	28 days
Orthophosphate	P, G	Filter immediately, cool, 4°C	48 hours
Oxygen, Dissolved Probe	G Bottle and top	None required	Analyze immediately
Winkler	do	Fix on site and store in dark	8 hours
Phenols	G only	Cool, 4°C, H_2SO_4 to pH<2	28 days
Phosphorus (elemental)	G	Cool, 4°C	48 hours
Phosphorus, total	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Residue, total	P, G	Cool, 4°C	7 days
Residue, Filterable	P, G	Cool, 4°C	7 days
Residue, Nonfilterable (TSS)	P, G	Cool, 4°C	7 days
Residue, Settleable	P, G	Cool, 4°C	48 hours
Residue, volatile	P, G	Cool, 4°C	7 days
Silica	P	Cool, 4°C	28 days
Specific conductance	P, G	Cool, 4°C	28 days

TABLE 2-16. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES (CONTINUED)

Name	Container[1]	Preservation	Maximum holding time
Sulfate	P, G	Cool, 4°C	28 days
Sulfide	P, G	Cool, 4°C, add zinc acetate plus sodium hydroxide to pH>9	7 days
Sulfite	P, G	None required	Analyze immediately
Surfactants	P, G	Cool, 4°C	48 hours
Temperature	P, G	None required	Analyze
Turbidity	P, G	Cool, 4°C	48 hours
Organic Tests:			
Purgeable Halocarbons	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$	14 days
Purgeable aromatic hydrocarbons	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, HCl to pH2	14 days
Acrolein and acrylonitrile	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, Adjust pH to 4-5	14 days
Phenols	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction
Benzidines	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction
Phthalate esters	G, Teflon-lined cap	Cool, 4°C	7 days until extraction 40 days after extraction
Nitrosamines	G, Teflon-lined cap	Cool, 4°C, store in dark, 0.008% $Na_2S_2O_3$	40 days after extraction
PCBs, acrylonitrile	G, Teflon-lined cap	Cool, 4°C	40 days after extraction
Nitroaromatics and isophorone	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$ store in dark	40 days after extraction
Polynuclear aromatic hydrocarbons	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$ store in dark	40 days after extraction
Haloethers	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	40 days after extraction
Chlorinated hydrocarbons	G, Teflon-lined cap	Cool, 4°C	40 days after extraction
TCDD	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	40 days after extraction
Total organic halogens	G, Teflon-lined cap	Cool, 4°C, H_2SO_4 to pH<2	7 days
Pesticides Tests:			
Pesticides	G, Teflon-lined cap	Cool, 4°C, pH 5-9	40 days after extraction
Radiological Tests:			
Alpha, beta and radium	P, G	HNO_3 to pH<2	6 months

[1]Polyethylene (P) or Glass (G)

lisher. Table IB, Note 27.

(c) Under certain circumstances the Regional Administrator or the Director in the Region or State where the discharge will occur may determine for a particular discharge that additional parameters or pollutants must be reported. Under such circumstances, additional test procedures for analysis of pollutants may be specified by the Regional Administrator, or the Director upon the recommendation of the Director of the Monitoring and Supp Cincinnati.

(d) Under certain cir Administrator may ap ommendation by the ronmental Monitoring Laboratory, Cincinnati ternate test procedures use.

(e) Sample preservation procedures, container materials, and maximum allowable holding times for parameters cited in Tables IA, IB, IC, ID, and IE are prescribed in Table II. Any person

FIGURE 2C:

USE FOR DRINKING WATERS—ALL STATES EXCEPT

ILLINOIS

scribed preservation techniques, container materials, and maximum holding times applicable to samples taken from a specific discharge. Applications for variances may be made by letters to the Regional Administrator in the Region in which the discharge will occur. Sufficient data should be provided to assure such variance does not adversel affect the integrity of the sample. Such data will be forwarded lonal Administrator to the the Environmental Moni- Support Laboratory in Cin- p for technical review and tions for action on the plication. Upon receipt of endations from the Direc- Environmental Monitoring Laboratory, the Regional or may grant a variance applicable to the specific discharge to the applicant. A decision to approve or deny a variance will be made within 90 days of receipt of the application by the Regional Administrator.

TABLE II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter No./name	Container [1]	Preservation [2,3]	Maximum holding time [4]
Table IA—Bacterial Tests:			
1–4. Coliform, fecal and total	P, G	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	6 hours.
5. Fecal streptococci	P, G	do	Do.
Table IB—Inorganic Tests:			
1. Acidity	P, G	Cool, 4°C	14 days.
2. Alkalinity	P, G	do	Do.
4. Ammonia	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
9. Biochemical oxygen demand	P, G	Cool, 4°C	48 hours.
11. Bromide	P, G	None required	28 days.
14. Biochemical oxygen demand, carbonaceous.	P, G	Cool, 4°C	48 hours.
15. Chemical oxygen demand	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
16. Chloride	P, G	None required	Do.
17. Chlorine, total residual	P, G	do	Analyze immediately.
21. Color	P, G	Cool, 4°C	48 hours.
23–24. Cyanide, total and amenable to chlorination.	P, G	Cool, 4°C, NaOH to pH>12, 0.6g ascorbic acid [6].	14 days.[6]
25. Fluoride	P	None required	28 days.
27. Hardness	P, G	HNO_3 to pH<2, H_2SO_4 to pH<2.	6 months.
28. Hydrogen ion (pH)	P, G	None required	Analyze immediately.
31, 43. Kjeldahl and organic nitrogen	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
Metals:[7]			
18. Chromium VI	P, G	Cool, 4°C	24 hours.
35. Mercury	P, G	HNO_3 to pH<2	28 days.
3, 5–8, 10, 12, 13, 19, 20, 22, 26, 29, 30, 32–34, 36, 37, 45, 47, 51, 52, 58–60, 62, 63, 70–72, 74, 75. Metals, except chromium VI and mercury.	P, G	do	6 months.
38. Nitrate	P, G	Cool, 4°C	48 hours.
39. Nitrate-nitrite	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
40. Nitrite	P, G	Cool, 4°C	48 hours.
41. Oil and grease	G	Cool, 4°C, H_2SO_4 to pH<2	28 days.

Parameter No./name	Container [1]	Preservation [2,3]	Maximum holding time [4]
42. Organic carbon	P, G	Cool, 4°C, HCl or H_2SO_4 to pH<2.	Do.
44. Orthophosphate	P, G	Filter immediately, Cool, 4°C	48 hours.
46. Oxygen, Dissolved Probe	G Bottle and top.	None required	Analyze immediately.
47. Winkler	do	Fix on site and store in dark	8 hours.
48. Phenols	G only	Cool, 4°C, H_2SO_4 to pH<2	28 days.
49. Phosphorus (elemental)	G	Cool, 4°C	48 hours.
50. Phosphorus, total	P, G	Cool, 4°C, H_2SO_4 to pH<2	28 days.
53. Residue, total	P, G	Cool, 4°C	7 days.
54. Residue, Filterable	P, G	do	7 days.
55. Residue, Nonfilterable (TSS)	P, G	do	7 days.
56. Residue, Settleable	P, G	do	48 hours.
57. Residue, volatile	P, G	do	7 days.
61. Silica	P	do	28 days.
64. Specific conductance	P, G	do	Do.
65. Sulfate	P, G	do	Do.
66. Sulfide	P, G	Cool, 4°C add zinc acetate plus sodium hydroxide to pH>9.	7 days.
67. Sulfite	P, G	None required	Analyze immediately.
68. Surfactants	P, G	Cool, 4°C	48 hours.
69. Temperature	P, G	None required	Analyze.
73. Turbidity	P, G	Cool, 4°C	48 hours.
Table IC—Organic Tests.[8]			
13, 18–20, 22, 24–28, 34–37, 39–43, 45–47, 56, 66, 88, 89, 92–95, 97. Purgeable Halocarbons.	G, Teflon-lined septum.	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	14 days.
6, 57, 90. Purgeable aromatic hydrocarbons	do	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5], HC1 to pH2[9].	Do.
3, 4, Acrolein and acrylonitrile	do	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]; Adjust pH to 4–5 [10].	Do.
23, 30, 44, 49, 53, 67, 70, 71, 83, 85, 96. Phenols [11].	G, Teflon-lined cap.	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	7 days until extraction, 40 days after extraction.
7, 38. Benzidines [11]	do	do	7 days until extraction.[13]
14, 17, 48, 50–52. Phthalate esters [11]	do	Cool, 4°C	7 days until extraction; 40 days after extraction.
72–74. Nitrosamines [11,14]	do	Cool, 4°C, store in dark, 0.008% $Na_2S_2O_3$ [5].	Do.
76–82. PCBs [11] acrylonitrile	do	Cool, 4°C	Do.
54, 55, 65, 69. Nitroaromatics and isophorone [11]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5] store in dark.	Do.
1, 2, 5, 8–12, 32, 33, 58, 59, 64, 68, 84, 86. Polynuclear aromatic hydrocarbons [11].	do	do	Do.
15, 16, 21, 31, 75. Haloethers [11]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	Do.
29, 35–37, 60–63, 91. Chlorinated hydrocarbons [11].	do	Cool, 4°C	Do.
87. TCDD [11]	do	Cool, 4°C, 0.008% $Na_2S_2O_3$ [5]	Do.
Table ID—Pesticides Tests:			
1–70. Pesticides [11]	do	Cool, 4°C, pH 5–9 [15]	Do.
Table IE—Radiological Tests:			
1–5. Alpha, beta and radium	P, G	HNO_3 to pH<2	6 months.

Table II Notes

[1] Polyethylene (P) or Glass (G).

[2] Sample preservation should be performed immediately upon sample collection. For composite chemical samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

[3] When any sample is to be shipped by common carrier or sent through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of Table II, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater; Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater; Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater; and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

[4] Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analyses and still be considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer time, and has received a variance from the Regional Administrator under § 136.3(e). Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show that this is necessary to maintain sample stability. See § 136.3(e) for details.

[5] Should only be used in the presence of residual chlorine.

[6] Maximum holding time is 24 hours when sulfide is present. Optionally all samples may be tested with lead acetate paper before pH adjustments in order to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

[7] Samples should be filtered immediately on-site before adding preservative for dissolved metals.

[8] Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

[9] Sample receiving no pH adjustment must be analyzed within seven days of sampling.

[10] The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

[11] When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to 4°C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6–9; samples preserved in this manner may be held for seven days before extraction and for forty days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine), and footnotes 12, 13 (re the analysis of benzidine).

[12] If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0±0.2 to prevent rearrangement to benzidine.

[13] Extracts may be stored up to 7 days before analysis if storage is conducted under an inert (oxidant-free) atmosphere.

[14] For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7–10 with NaOH within 24 hours of sampling.

FIGURE 3

GREAT LAKES ANALYTICAL

1380 Busch Parkway • Buffalo Grove, Illinois 60089
(708) 808-7766 FAX (708) 808-7772

CHAIN OF CUSTODY

lient:	Project:
^ddress:	Sampler:
	PO #:
eport to:	Turn-Around Time: 5 Day 3 Day 1-2 Day < 24 Hr.
Phone #:	Date Results Needed:

Sample Description	Date/ Time	# /Type Cont.	Analysis/Remarks	Lab #
2				
'				
4				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Sample Condition: Violated: Y N Preserved: Y N In Good Condition: Y N

Relinquished:	Date/Time:	Recieved:
.nquished:	Date/Time:	Recieved:
Relinquished:	Date/Time:	Recieved:

Comments:

Page of

FIGURE 4

CLIENT NAME	PROJECT ID	DATE REC'D	REC'D BY	SAMPLE NUMBER	REPLICATE ID'S	SAMPLE COND		MATRIX	WET CHEM	METALS	GC	GC/MS	OTHER	TAT	COMMENTS
						OK	VIOLATD								

MONTH:	PAGE:

Figure 5: STANDARD CURVE CHECK

RESPONSE FACTOR (Ave): ____________ ANALYST: ____________

ACCEPTANCE LIMITS OF RESPONSE FACTOR: ____________ ANALYSIS: ____________

DATE	RESPONSE FACTOR	% of Res. FACTOR	DATE	RESPONSE FACTOR	% of RESPONSE FACTOR

FIGURE 6:GREAT LAKES ANALYTICAL QUALITY CONTROL REPORT

ANALYSIS:	*METHOD:*	*MATRIX:*
ANALYST:	*NOTEBOOK #:*	*UNITS:*

	DATE ANALYZED	QC SAMPLE NUMBER	LAB BOOK PAGE	DET. LIMIT	SAMPLE CONC. R1	SPIKE CONC. ADDED S	CONC. MATRIX SPIKE R2	MATRIX SPIKE REC. %	CONC. MATRIX SPIKE DUP. R3	MATRIX SPIKE DUP. REC. %	REL. DIF. %
1											
2											
3											
4											
5											
6											
7											
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11											
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19											
20											

% RECOVERY = ((R2 - R1) / S) X 100   RELATIVE % DIFFERENCE = ((R2 - R3)/(R2 = R3)/2) X 100

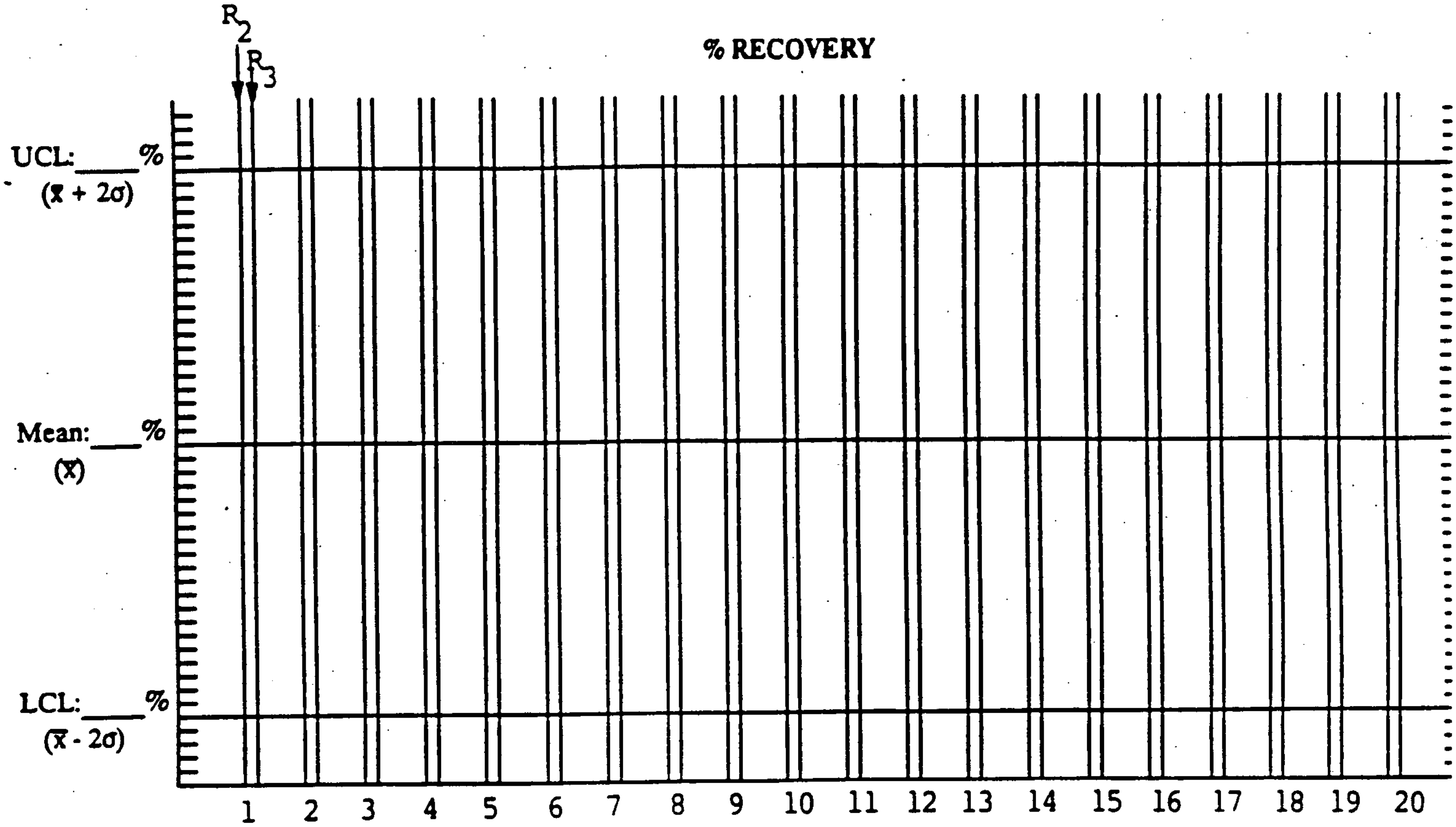
Figure 7

GREAT LAKE ANALYTICAL Q. C. GRAPH

Analysis: ____________ Method Number: ____________ Matrix: ____________

Analyst: ____________ Date Control Limits Established: ____________

% RECOVERY



RELATIVE % DIFFERENCE

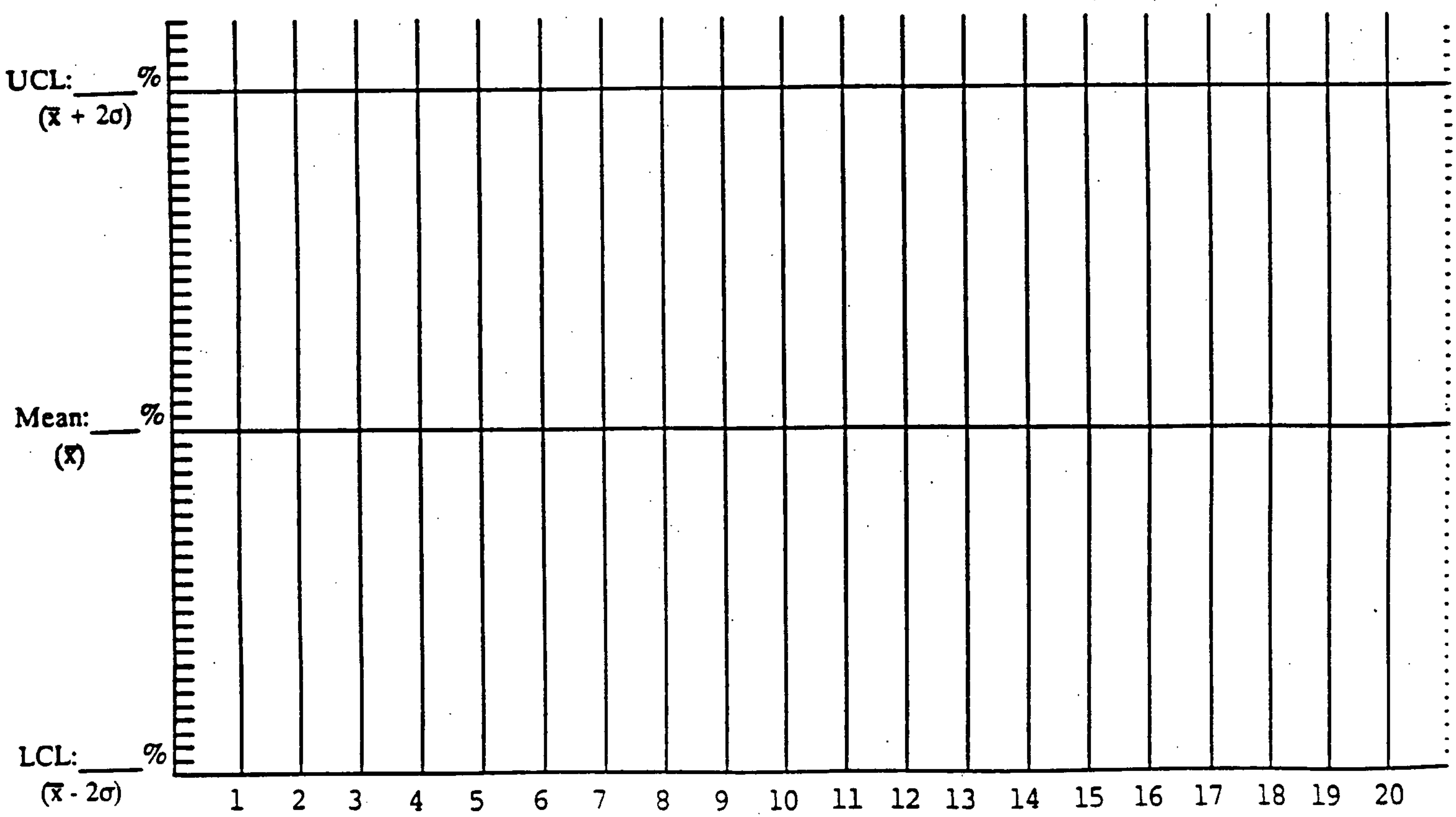


FIGURE 8:

CORRECTIVE ACTION REPORT

ANALYST: ______________________

ANALYSIS: ______________________

DATE: ______________________

IDENTIFICATION AND DEFINITION OF PROBLEM:

DETERMINATION OF THE CAUSE OF THE PROBLEM:

CORRECTIVE ACTION:

VERIFICATION THAT PROBLEM HAS BEEN ELIMINATED:

Figure 9

Revision 1.0 **Summary: QA/QC Performance Audit Report**

Analyst:____________ Initial Review Date:_________

Analyses:____________ Follow-up Review Date:________

Documentation Checklist:

___ Current QA Manual

___ Methods organized

Method Validation:

___ Detection limits

___ Precision Study

___ Accuracy Study

___ Retention times established (if Applicable)

___ Reagent Preparation Sheets

___ Graph of Working Calibration Curve (calculations for x, s, r, and %RSD). Number of points determined by the method.

___ Matrix Spike and Matrix Spike Duplicate sheets filled out and current (% Recovery and % Relative Difference calculated). Minimum frequency is every 20 samples.

___ Matrix Spike and Matrix Spike Duplicate graphs are current (computer or hand-drawn).

___ Matrix Spike and Matrix Spike Duplicate limits are calculated every 20 entries.

___ Daily Calibration Verification Log (refer to method for specific limits allowed).

___ Daily Retention Time Log (from calibration verification check). Limits are documented.

___ Laboratory Control Sample Log (minimum requirement is one dissimilar source per working day).

___ Current Maintenance Log for each instrument.

___ Variation to methods documented and current.

___ Corrective Action Sheets prepared as needed.

Lab Notebooks:

___ Analyses, dates on cover

___ Analysis, date on page

___ Client name and Great Lakes Analytical sample numbers on pages.

___ Analyst signature and date

___ Matrix type documented

___ Extraction method, date, and volumes (if applicable).

Lab Notebooks (continued):

- ___ Dilution factors using volumes and weights (not just ratios).
- ___ Instrument used
- ___ Instrument operating conditions (method and variations).
- ___ Analytical aliquot
- ___ Calculations with all appropriate units. Page location of calculations should be on reports.
- ___ Records are in ink
- ___ Z-out blank pages
- ___ Great Lakes Analytical lab number on raw data printouts for tracking.

Comments:

____

Analyst:______________________

Date:__________

Signature of Auditor:______________________

Date:__________

APPENDIX B

SITE-SPECIFIC HEALTH-AND-SAFETY PLAN

FINAL SITE-SPECIFIC SAFETY AND HEALTH PLAN FOR RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS PESTICIDE STORAGE FACILITY AND COLYER MANOR SITE, FORT RILEY, KANSAS

CONTRACT NO. DACW45-94-D-0005
DELIVERY ORDER NO. 2

Submitted to:

United States Army Corps of Engineers
Omaha, Nebraska

Prepared by:

OHM Remediation Services Corp.

Gina Rejent
Industrial Hygienist
Midwest Region

Reviewed by:

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Phil Connor
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Approved by:

Bill Thomas

Bill R. Thomas, CIH, CHP
Health and Safety Manager
Midwest Region

January 27, 1994
Project 15480

TABLE OF CONTENTS

1.0 INTRODUCTION

OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, has been contracted to remove contaminated soils from the Pesticide Storage Facility (PSF) and Colyer Manor site in Fort Riley, Kansas.

1.1 PROJECT BACKGROUND

The United States Army Corps of Engineers (USACE), Kansas City District, on behalf of Fort Riley, requested that the USACE Omaha District utilize the Rapid Response Program to execute removal actions at the PSF and the Colyer Manor sites in Fort Riley, Kansas. The Omaha District reviewed and accepted this project based on a moderate risk to human health, a moderate risk to a drinking water source of the environment, and to achieve compliance with current regulations.

This Rapid Response project will consist of contaminated soil removals at two sites at Fort Riley, Kansas: the PSF and Colyer Manor. At the PSF, the primary contaminants to be removed are DDT, dieldrin, heptachlor, arsenic, and chlordane. At the Colyer Manor, the contaminant to be removed is lead. The purpose of the remedial actions at each of the sites is to remove all soils containing contaminants above the cleanup levels specified.

1.1.1 Site History

The PSF was constructed in 1941 to serve as a general warehouse facility. The building has been used to store pesticides and herbicides since at least 1973. In 1984 the facility was modified to meet federal standards for safe storage of pesticides.

The lead-contaminated soil area of concern for this project (Colyer Manor) was first identified as an area suspected of being contaminated with lead bullet fragments in 1992 in the Installation Wide Site Assessment. In 1993, the area was investigated and found to be significantly contaminated with lead.

1.1.2 Site Description

The PSF is identified by Building No. 348. Contaminated soils to be excavated exist east of Building No. 348. The area is bounded on the east by a fence; however, contamination exists outside the fenced area. The area to be excavated is generally flat and covered with gravel up to the fence. Beyond the fence the terrain drops off sharply into a ravine.

Colyer Manor is a generally flat housing area in Camp Forsyth. Contaminated soils to be excavated are north of the housing area at the base of a hill. A drainage swale exists between the area to be excavated and nearby housing units.

1.1.3 Site Location

Fort Riley is located in northeast Kansas. The PSF is located in the Main Post, and Colyer Manor is located in Camp Forsyth. Refer to Exhibit I for a map of Fort Riley and site maps for the PSF and the Colyer Manor site.

1.2 REGULATORY REQUIREMENTS

All investigation/removal activities shall comply with and reflect the following regulations and appropriate guidance publications, as a minimum:

- Federal Acquisition Regulation, F.A.R., Clause 52.236-13: Accident Prevention.
- USACE, Safety and Health Requirements Manual, EM 385-1-1 (October 1992).
- Occupational Safety and Health Administration (OSHA) Construction Industry Standards, 29 CFR 1926; and General Industry Standards, 29 CFR 1910; especially 29 CFR 1926.65*, "Hazardous Waste Site Operations and Emergency Response;" 29 CFR 1910.1000, "Air Contaminants."
- NIOSH/OSHA/USCG/USEPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.
- Other applicable federal, state, and local safety and health requirements.

*The governing standard for Hazardous Waste Site Operations, 29 CFR 1910.120, has been transferred to the construction standard and given the identifier 29 CFR 1926.65. All specific paragraph references retain the same number.

1.3 APPLICABILITY OF THE SITE-SPECIFIC SAFETY AND HEALTH PLAN

This Site-specific Safety and Health Plan (SSHP) is prepared in accordance with the standards established by OSHA for hazardous waste sites. Specifically, this SSHP complies with the appropriate sections of 29 CFR 1926.65, "Hazardous Waste Operations and Emergency Response."

Additionally, this SSHP details the health and safety measures that will be in effect for the duration of this project. This document is intended for field use by OHM personnel and subcontractors, and these personnel are required to abide by it. Where not specifically mentioned, OHM will follow all pertinent regulations contained in 29 CFR 1910, and 1926, and USACE EM-385-1-1 in conducting this work.

This document may require revision as the project progresses. All revisions must be approved by the OHM Midwest Region Health and Safety Manager. Revisions must be made in writing and incorporated into the document or attached as an amendment to this document.

It is the goal of OHM to successfully complete this project with all due regard and respect for appropriate professional safety protocol. It is also OHM's objective to complete the entire project without logging any OSHA-recordable accidents.

1.4 VISITORS

Visitor access to regulated project areas such as the exclusion and contamination reduction zones shall be restricted. The following criteria must be met for visitors to gain access to these areas:

- Visitors must provide proof of participation in a medical surveillance program that complies with requirements stated in 29 CFR 1926.65(f).
- Visitors must provide proof of training accomplishment equivalent to standards set forth in 29 CFR 1926.65(e). This training must have been received within 1 year from the date of desired access. Some visitors may be required to show proof of the specified 8-hour refresher training within the same time frame.
- Visitors must read the SSHP and sign the form contained in Exhibit II. By signing the form, visitors agree to comply with all specifications contained in the SSHP and agree to comply with all applicable OSHA requirements.
- Visitors who do not adhere to these requirements shall not be allowed access and/or be requested to leave the regulated work areas.

1.5 SCOPE OF WORK

The scope of work for all sites in this remediation project is included in the summary below:

- Mobilize and set up
- Perform soil sampling and analysis
- Excavate contaminated soils
- Stockpile excavated soils
- Perform confirmation sampling
- Dispose of drums
- Decontaminate equipment
- Demobilize

1.6 MANAGEMENT ORGANIZATION

The OHM management organization on this project will be as follows:

- Site Supervisor--All personnel working on the site ultimately report to this individual who has authority over all phases and is the senior OHM on-site representative. The site supervisor is the primary safety official for this project and is responsible for ensuring the SSHP is properly implemented and all activity is performed in a healthful and safe manner. It is the duty of the site supervisor to perform weekly safety inspections of the project and to monitor the safety performance of all personnel on a daily bases. The site supervisor is the designated competent person should any excavation exceed 4 feet in depth.

- General Foreman--This individual's duty is to disseminate information, assign tasks, and coordinate efforts between the multiple OHM crews. This person reports directly to the site supervisor.

- Foreman--This individual's duty is to coordinate the activities of a specific work crew. This person reports to the general foreman.

- Recovery Technician--This individual safely completes the on-site tasks required to fulfill the work plan, complies with the SSHP, and notifies the site health and safety officer (HSO) of unsafe conditions. This person reports to the foreman.

- Health and Safety Officer--This individual is delegated the responsibility to assist the site supervisor in the implementation and enforcement of the safety and health program and site-specific plan elements on site. The HSO is also responsible for monitoring the effectiveness of the SSHP, air monitoring, accident reporting, etc. He/she has the authority to temporarily cease any project phase or operation deemed either inherently dangerous to life and health or not in compliance with the SSHP. In addition, he/she can cause the removal of any person who is deemed inherently unsafe or a threat to the safety of other individuals at or in the vicinity of the project. The HSO reports to the site supervisor and the Regional Health and Safety Manager.

- Certified Industrial Hygienist (CIH)--The Regional Health and Safety Manager is the project CIH. This individual, being experienced in hazardous waste material operations, is responsible for the development, implementation, and oversight of the Safety and Health Program and SSHP.

2.0 RESPONSIBLE AUTHORITIES

The following people are responsible for safety and health on this project:

▸ Site Supervisor	Bill Fenwick
▸ Site Health and Safety Officer	TBD
▸ Alternate HSO	TBD
▸ Regional Health and Safety Manager	Bill R. Thomas, CIH, CHP 419-424-4960
▸ Project Manager	Phil Connor 708-963-0005
▸ Operations Manager	Joseph Green 419-425-6074
▸ Executive Vice President, Midwest Region	Daniel P. Buettin 419-424-4960
▸ Vice President of Health and Safety	Fred Halvorsen, Ph.D., P.E., CIH 419-424-4910

TBD = To be determined prior to mobilization.

Additionally, as stated in the OHM Employee Safety Guide, each employee is responsible for his own personal safety and the safety of his co-workers.

3.0 PROJECT HAZARDS

The general categories of hazards that may be present at this project are described in this section. The main divisions of health hazards at this site are chemical, physical, and environmental. The pathways for hazardous substance dispersion at this project are personnel and equipment tracking, and migration via dust/dirt in the air.

3.1 CHEMICAL HEALTH HAZARDS

Preventing exposure to toxic chemicals is a primary concern at this hazardous material remediation project. This project contains a variety of chemical substances; however, with the exception of fuels, these will be found mostly as solids in the soils. These substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact. A summary of the generalized chemical health hazards expected at this project is presented below.

3.1.1 Lead

Lead is present at this project in bullets buried in the soil. Exposure could be from contact exposure, oral ingestion, or inhalation. The symptoms and effects of exposures to lead are summarized as follows:

- Acute Exposure--Short-term, high concentration exposure to lead by unprotected personnel causes eye, nose, and throat irritation. A slight metallic taste and severe gastric disturbances have been noted by some people.

- Chronic Exposure--Workers in other industries, such as foundries or metal refining operations, who have long-term exposure without, or with limited benefit of protective equipment, have been found to have liver, kidney, and central nervous system impairment.

Since lead is a solid metal with a melting point of 621 degrees Fahrenheit and a molecular weight of 207.2, the vapor pressure for lead is approximately 0 mm. Guidelines for ionization potential, odor threshold, and flammability ranges are not applicable.

The following exposure limits have been established for lead and must not be exceeded:

Compound	OSHA-PEL	NIOSH-REL	ACGIH-TLV
Lead	0.05 mg/m^3	<0.1 mg/m^3	0.15 mg/m^3

All workers should be aware of strange odors, irritation, and feelings of discomfort or extreme well being. Often these signs can indicate chemical exposure is occurring.

A Material Safety Data Sheet (MSDS) is attached in Exhibit III, which describes in more detail, the chemical, physical, and health hazards posed by lead.

Acute and chronic exposures to arsenic above the exposure limits can be summarized as follows:

- Acute Exposure--Eye, nose, and throat irritation, coughing, upset stomach, nausea, shortness of breath, weakness, chills and fever, headache, hoarseness, diarrhea, coughing up blood, skin rash.

- Chronic Exposure--Poor coordination, difficulty in speaking, tremor (shakes), kidney damage, liver damage, unstable emotions, recurring chills and fever, and possible carcinogen.

3.1.2 Organochlorine Pesticides

Organochlorine pesticides contaminate the soil east of the PSF (Building No. 348) on site. Pesticides present include DDT, dieldrin, chlordane, heptachlor, and arsenic. These pesticides vary in appearance, but all are toxic by ingestion, inhalation, and skin absorption. Arsenic is a confirmed human carcinogen.

Exposure limits for these pesticides are as follows:

Chemical	ACGIH-TLV	OSHA-PEL
Arsenic	0.01 mg/m^3	0.01 mg/m^3
Chlordane	0.5 mg/m^3 of air	0.5 mg/m^3 (skin)
DDT	1.0 mg/m^3 of air	1.0 mg/m^3 (skin)
Dieldrin	0.25 mg/m^3 of air	0.025 mg/m^3 (skin)
Heptachlor	0.5 mg/m^3 of air	0.5 mg/m^3 (skin)

3.1.3 Petroleum Distillates and Cleaning Compounds

Operational compounds such as fuels for heavy equipment will be used to complete this project. Aside from some petroleum distillates (fuels) being EXTREMELY FLAMMABLE and cleaning compounds being potentially corrosive, personnel must also recognize the health hazards associated with these compounds. The health hazards associated with these materials and acute and chronic exposure symptoms are summarized as follows:

- Petroleum distillates that will be used as fuel (depending on product, odor of gasoline or kerosene may be noted)

    - Acute exposure--Dizziness, nausea, weakness, euphoria (feeling good), mild skin irritation, inhalation of concentrated vapors or aspirated liquids can cause death by chemical pneumonia

    - Chronic exposure--Skin irritation; damage to liver, kidneys, and blood compounds; leukemia (benzene)

- Cleaning compounds which may be used by site personnel for equipment decontamination purposes (cleaning compounds can have a pungent, irritating, or scented odor)

    - Acute exposure--Skin, eye, nose, and throat irritation

    - Chronic exposure--Undetermined but continuing skin irritation is possible, damage to the respiratory tract

Primary exposure routes for these materials include inhalation, ingestion, and skin contact. Personnel must be alert for signs and symptoms of possible exposure and must immediately report them to the site supervisor and/or HSO.

MSDSs for materials brought on site are found in OHM's written Hazard Communication Program, found in the project office trailer.

3.1.4 Hazard Communication

The purpose of hazard communication (Employee Right-to- Know) as required by 29 CFR 1926.59, is to ensure that the hazards of all chemicals used to complete this field project are communicated to all OHM personnel and OHM subcontractors. Hazard communication includes the following:

- Container Labeling--OHM personnel must ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations personnel. All incoming and outgoing labels must be checked for identity, hazard warning, and name and address of responsible party.

- MSDS--There must be a MSDS available on site for each hazardous chemical used. MSDSs for all chemicals brought and used on site are provided in the OHM's Written Hazard Communication Program, which can be found in the project office trailer. MSDSs for site-specific chemicals can be found in Exhibit III of this plan.

- Employee Information and Training--Training employees on chemical hazards is accomplished through an ongoing corporate training program. Additionally, chemical hazards must be communicated to employees through daily safety meetings held at OHM field projects and/or by an initial project orientation program.

At a minimum, personnel must be instructed on the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- Mechanisms to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals
- How to read and interpret labels and MSDSs for hazardous substances found on OHM sites
- Emergency spill procedures
- Proper storage and labeling

Before any new hazardous chemical is introduced on site, each employee must be given information in the same manner as during the safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available. The information pertinent to the chemical hazards will be communicated to project personnel.

Morning safety meetings are to be held and the hazardous materials used on-location will be discussed. Attendance is mandatory for all personnel.

- Subcontractor Information and Training--It shall be the responsibility of the site supervisor to ensure that all subcontractors coming onto the project site are informed of the hazardous chemicals present, effects of exposure, location of MSDS, location of emergency equipment (i.e., eyewash, fire extinguisher), and emergency spill and evacuation procedures. By signing the SSHP acknowledgment form, located in Exhibit II of the SSHP, the subcontractor is acknowledging receipt of all of this information. The site supervisor shall also ensure that subcontractors submit information on chemicals that they are responsible for introducing to the project area. All chemicals introduced to these areas must be accompanied by the appropriate MSDS. This information can be exchanged at the daily morning safety meeting. These meetings must be attended by all subcontractors.

3.2 PHYSICAL HAZARDS

There are many physical hazards associated with this project. Hazard identification, training, adherence to work rules, and careful housekeeping can prevent many problems or accidents arising from physical hazards. The following text outlines the physical hazards associated with this project and suggested preventative measures:

- Mechanical/Electrical Energy--Lockout and tagout procedures may need to be applied for specific work at this job. In the event that some operation requires lockout and tagout procedures, review and apply the standard operating procedures presented in Exhibit IV.

- Bulky or Heavy Loads--Intelligent thought shall be exercised before heavy and bulky loads are lifted or handled manually by personnel. Mechanical equipment such as forklifts, wheel barrows, hand-trucks, loaders, and cranes shall be utilized when possible and needed. **Note: Back injuries are real, debilitating, unproductive, and costly to both employees and employers, and sometimes permanent. Back injury prevention must be given high priority on all project sites. If you think the load you are about to lift is too heavy or bulky, it probably is - get help or utilize mechanical equipment, or do not attempt to lift it.** See Exhibit V for the Safe Lifting Procedure.

- Hoisting Accidents--Employees can have suspended loads dropped on them, or be caught or smashed between a load and a stationary object. All hoisting must be done by qualified personnel only after inspections are made and documented, of chokers, slings, and cables. In addition, no hoisting will take place without a designated signal man present. Chains are not appropriate for vertical lifts.

- Small Quantity Flammable/Combustible Liquids--Small quantities of flammable/combustible liquids must be properly stored in "safety" cans with appropriate flame arresters, and labeled according to contents.

- Bulk Fuel Storage--A bulk fuel storage area must be designated for storage of bulk fuels and other flammable materials. The bulk fuel vessels must be grounded and have bonding cables attached. The area must be prominently posted as "flammable" and no smoking signs erected. At least one 20-pound dry chemical, ABC-type fire extinguisher must be available in this area.

- Heavy Equipment--Each morning before startup, all heavy equipment must be inspected to ensure all safety equipment and devices, (e.g., backup alarms, brakes, control levers, and fire extinguishers) are operational or ready for immediate use. Only qualified personnel may operate this equipment. Before crossing either in front of or behind a piece of heavy equipment, the ground personnel will signal the equipment operator and receive confirmation before moving. During excavation activity, the swing-radius area of excavators should be marked and personnel should be prohibited in this area.

- Slip/Trip/Fall Hazards--All ground personnel should be constantly aware of the possibility of slip, trip, and fall hazards due to poor and possibly slippery footing in the work areas. Some areas may have wet surfaces, which will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with the fall hazard. Since all stairs with four or more risers are equipped with handrails, one would be wise to use them. Good housekeeping practices are essential to minimize the trip hazards.

- Electrical Hazards--Electrical devices and equipment must be de-energized prior to working near them. All extension cords must be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits must be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Lockout and tagout procedures may be applicable (see Exhibit IV).

- High-Pressure Washing--Pressure washing of equipment may require the use of high-pressure washers. These devices can be hazardous if not used properly. Refer to Exhibit VI for specific standard operating procedures for high pressure washer.

- Noise--Some equipment often used may create excessive noise. The effects of noise can include:

  - Workers being startled, annoyed, or distracted

  - Physical damage to the ear, which may cause pain, or temporary and/or permanent hearing loss

  - Communication interference that may increase potential hazards due to the inability to warn of danger

  If employees are subjected to noise exceeding an 8-hour TWA sound level of 85 dBA (decibels on the A-weighted scale), feasible administrative or engineering controls must be utilized.

- Excavation Hazards--A competent person shall be on site to inspect the excavations daily, characterize soils, and implement the appropriate safeguards. Underground utilities shall be located prior to excavation. Dust control techniques will be implemented along with other excavation safety requirements. Refer to Exhibit VII for Excavation Safety Procedures.

- Confined Spaces--Excavation work for this project should not require personnel to enter confined spaces; however, if the depth of the excavation is four feet or more, the appropriate confined space entry procedure shall be followed, a permit shall be completed, and the regional manager of health and safety shall be consulted. See Exhibit VIII of this plan for the Confined Space Entry Procedure and Permit.

3.3 ENVIRONMENTAL HAZARDS

The primary environmental hazard to be considered during site-specific work is cold stress. Because work on this project is expected to be performed during the winter months, heat stress is not expected to present a hazard.

3.3.1 Cold Stress

Working outside in conditions of low ambient temperature can subject workers to cold stress, which includes frostbite and hypothermia. As a minimum, the following precautions must be taken if ambient temperatures are expected to be below:

- Training sessions are to be regularly held to emphasize warning symptoms such as reduced coordination, drowsiness, impaired judgment, fatigue, and numbing of toes and fingers.

- Workers must be outfitted with winter clothing as necessary.

- Clothing must be changed as soon as it becomes wet.

- Warm shelters and regular rest periods will be available for crew members.

- Warm beverages should be provided.

Additional information pertaining to and standard operating procedures for evaluating cold stress are included in Exhibit IX.

4.0 SITE CONTROL

The purpose of site control is to minimize potential contamination of workers, protect the public from the area activities, and prevent loss due to vandalism.

The excavation areas for this job vary with respect to characterization of work zones, area control and access. The exclusion zone and its respective work zones for each excavation may vary with respect to size and location, and should be based upon surveys conducted of each area once crews are on site.

4.1 DESIGNATION OF WORK ZONES

To prevent both exposure to unprotected personnel and migration of contamination due to tracking by personnel or equipment, work zone areas must be clearly identified.

Work areas or zones should be designated as suggested in "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/USEPA, November 1985. Each of the work areas must be divided into three zones:

- Exclusion zone (dirty or contaminated)
- Contamination reduction zone (CRZ or transition)
- Support zone (clean)

In general, the exclusion zone includes **all** designated work areas **and** all areas where chemicals and physical hazards exist. These zones should be marked with caution tape or other suitable means.

Site excavation access will occur from the support zone through the contamination reduction zone (CRZ) to the exclusion zone. The CRZ should be a corridor located where the support zone is upwind (for example, if wind is blowing from the north, the CRZ corridor will be north of the excavation). These zones will be determined once on site, as wind direction and other environmental factors will be considered in the delineation of the CRZ.

4.2 EXCLUSION ZONE

The exclusion zone will consist of active work areas where chemical and physical hazards exist, or have the potential to exist, during operations. The exclusion zone shall be marked with caution tape. All personnel entering this area must wear the prescribed level of protective equipment. Unauthorized personnel shall not be allowed in this area. Work zones within the exclusion zone are to be designed once personnel are on site and should be based upon the site survey.

4.3 CONTAMINATION REDUCTION ZONE

The CRZ will be a clearly marked corridor(s) between the exclusion and support zones; this is where personnel will begin the sequential decontamination process when exiting the exclusion zone. To prevent cross contamination and for accountability purposes, all personnel will enter and leave the exclusion zone through the contamination reduction zone. Appropriate equipment for hygienic activity such as soap, water, and towels, shall be made available in this area. Emergency equipment such as eyewash, first aid kit, and emergency alarm shall be made available in this area. The location and delineation of the CRZ will be contingent on the location of the exclusion zone and conditions of the area, and will therefore be determined upon mobilization to the area(s).

4.4 SUPPORT ZONE

The support zone should be located upwind, if possible and shall be secured against active or passive contamination from the work site. The support zone will consist of those areas adjacent to the exclusion zone where support trailers and equipment are staged. Eating, drinking, and smoking will be allowed only in this area.

4.5 SITE MAP

Site maps must be developed showing the location of emergency equipment and work zones and egress routes. These maps must be posted. The maps must be updated as site conditions change. Refer to Exhibit I for review of the site maps.

4.6 SITE SECURITY

Site security is necessary to:

- Prevent chemical and physical exposures to unauthorized and/or unprotected people by site hazards
- Avoid the increased hazards and liabilities from vandals or persons seeking to abandon other wastes on site
- Prevent theft
- Avoid interference with safe working procedures

To maintain site security during working hours:

- Control points must be maintained to control personnel access to the exclusion and decontamination zone

- An identification system of some fashion should be established to identify authorized persons

- Responsibility for enforcing exclusion zone entry and exit requirements should be assigned

To maintain site security during off-duty hours:

- Barricade open excavations
- Secure the equipment
- Notify the local police department of site activities

4.7 THE BUDDY SYSTEM

Activities in contaminated or otherwise hazardous areas should be conducted with a buddy who is able to:

- Maintain sight of his other partner
- Provide his or her partner with assistance
- Observe his or her partner for signs of chemical or heat/cold exposure
- Periodically check the integrity of his or her partner's protective clothing
- Notify the site supervisor or others if emergency help is needed

4.8 SITE COMMUNICATIONS

Two sets of communication systems should be established: internal communication among on-site personnel and external communication between on-and off-site personnel.

Internal communication for this project will consist of Motorolla hand-held radios in combination with a stationary base unit.

Internal communication is used to communicate the following information for this project:

- Alert team members to emergencies
- Answer questions concerning work operations
- Communicate changes in the work to be accomplished
- Maintain work area control

Verbal communication on site can be impeded by area background noise and the use of personal protection equipment (PPE). All communication devices used in a potentially explosive or flammable atmosphere must be intrinsically safe and not capable of sparking: The internal communication systems used on this project may be hand-held radios and/or voice communication.

An external communication system between on- and off-site personnel is necessary to:

- Coordinate emergency response
- Report to management
- Maintain contact with essential off-site personnel

The primary means of external communication is by telephone. All personnel must be informed as to the location of the telephone or nearest available telephone.

4.9 COMMUNICATION PROCEDURES

Personnel in the exclusion zone should remain in communication or within sight of other project personnel. Difficulties in maintaining communications requires an evaluation of whether personnel should leave the exclusion zone.

A 30-second blast on the air horn is the emergency signal to indicate that all personnel should leave the exclusion zone and assemble in the contamination reduction zone. Evacuation routes are to be established once personnel are on site.

5.0 ACCIDENT PREVENTION PROGRAM

This section of the SSHP serves as the Accident Prevention Program (APP).

5.1 HEALTH HAZARD ANALYSIS

A health hazard analysis has been developed in the form of Phase Safety Plans to examine the health and safety hazards inherent within each separate project task. The goal of this exercise is to enable personnel to recognize, evaluate, and control hazards before they develop. This exercise is intended to identify hazards in a task-specific fashion, in addition to the broad identification outlined in Section 3.0. This hazard analysis must be further developed by project supervisory staff while on site prior to beginning any specific activity, and then incorporated into this SSHP on an ongoing basis. The Phase Safety Plans are intended to be used by all site personnel, who are encouraged to discuss and expand upon valuable information about task hazards. Controls are often determined by experienced personnel or by dialogue between thoughtful and interested crew members. Brainstorming sessions can sometimes identify serious hazards that may at other times be overlooked or forgotten.

For the purposes of hazard analysis, this project can be divided into eight separate tasks as follows:

- Mobilize and set up
- Perform soil sampling and analysis
- Excavate contaminated soils
- Stockpile excavated soils
- Perform confirmation sampling
- Dispose of drums
- Decontaminate equipment
- Demobilize

5.1 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Mobilize and Set Up	Potential atmospheric and contact hazards from chemical agents	1) Implement air monitoring program for detection of lead and pesticides. 2) Exclusion zone shall be delineated and PPE shall be utilized as necessary. 3) Safety orientation meetings must be held. 4) Implement wet method for dust control during all phases of activity. Unless the area is already wet, the excavation area should be pre-wetted to prevent visible emissions.
	Strains from manually moving materials and equipment	1) Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment. See Exhibit V for the safe lifting procedure. 2) Hand truck use shall be encouraged.
	Slips, trips and falls from various agents	1) Work areas shall be visually inspected and pre-existing slip, trip, and fall hazards shall be marked, barricaded, or eliminated as is feasible. 2) Work areas shall be kept neat and in an orderly state of housekeeping. 3) Proper illumination shall be maintained in work areas.

5.1 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Mobilize (continued)	Heavy equipment hazards	1) Only qualified personnel shall operate heavy equipment.
		2) Heavy equipment safety procedures shall be implemented.
		3) All heavy equipment shall be inspected daily and documented prior to use.
		4) All heavy equipment shall be inspected prior to use. Inspections shall be documented.
	Electrocution	1) Only qualified electricians shall be allowed to hook-up electrical circuits.
		2) All extension cords shall be inspected daily for structural integrity, ground continuity, and damaged areas.
		3) Extension cord inspection should be documented, ground fault circuit interrupters (GFCI) should be used on all 110-120 v circuits.
		4) Electric wire or flexible cord passing through work area shall be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
		5) Plugs and receptacles shall be kept out of water unless of an approved submersible type.
		6) All electrical circuits shall be grounded in accordance with the NEC and the NESC.

5.2 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Perform Soil Sampling and Analysis	Atmospheric and contact hazards from chemical and physical agents	1) PPE use shall be required. 2) Ambient air monitoring and visual monitoring shall be used to verify selection of PPE. 3) Prevent potential ingestion by not eating, drinking, smoking, putting hands or other objects near mouth.
	Injury from use of sampling equipment (x-ray fluorescence analyzer)	1) Sampling equipment (XRF) shall be inspected before each use. 2) Personnel shall have been trained in the use of sampling equipment (XRF). 3) General safety precautions shall be taken while using XRF: do not operate the analyzer unless the probe and sample are in place; do not remove a sample or move the probe while the indicators show SOURCE ON; avoid contact with the top of the probe; never aim the probe at yourself or another person; and return the analyzer to the manufacturer when it is damaged or for maintenance.

5.3 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Excavate Contaminated Soils	Atmospheric and contact hazards from chemical agents	1) PPE use shall be required as outlined in Section 6.0. 2) Ambient air monitoring for lead and pesticides shall be performed during intrusive activities involving these materials to verify selection of PPE. 3) Dust control must be given high priority. A water mist and tarps or other coverings shall be used as needed to keep dust levels to a minimum. 4) Perimeter air monitoring for lead shall be performed during excavation at the Coyler Manor site to evaluate off-site emissions.
	Excavation hazards from soil (and gravel/concrete) removal	1) Personnel shall follow standard operating procedures for excavation safety (see Exhibit VII.) Confined space entry should not be required for this job as it stands; however, if conditions would require confined space entry at any of the excavation sites, appropriate guidelines should be acquired. 2) All overhead and underground utility lines shall be located and protected/avoided prior to excavation. 3) A spotter shall be used during excavation to guide operations and protect ground personnel.

5.3 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Excavate Contaminated Soils (continued)	Strains from use of tools	1) Personnel shall maintain rational pace when using tools and given adequate rest periods.
		2) Tools shall be maintained in good condition.
		3) Select appropriate tool for the job (size, type.)
	Heavy equipment hazards	1) Only qualified personnel shall operate heavy equipment.
		2) All heavy equipment shall be inspected daily prior to use.
		3) All inspections shall be documented.
		4) All heavy equipment on this project shall be equipped with Roll-Over Protection Systems (ROPS) and backup alarms.
		5) Personnel shall be cognizant of the boom swing area and stay clear of its path.
		6) Follow all specified capacities (speed, load.)

5.4 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Stockpile Excavated Soils	Excavation hazards	1) All previously stated safety precautions and OHM standard operating procedures for excavation safety (Exhibit VII) shall apply, especially with respect to open excavations.
	Heavy equipment hazards	1) Operators shall be qualified to operate heavy equipment.
		2) All heavy equipment shall be inspected and documented daily prior to use.
		3) All heavy equipment on this project shall be equipped with Roll-Over Protection Systems (ROPS), back-up alarms, and seat belts.
		4) Personnel shall be cognizant of the boom swing area and stay clear of its path. The area should be marked and/or roped off if possible.
		5) Personnel shall remain outside of stockpiling area.
		6) A warning device or signal person shall be provided where there is danger to persons from moving equipment, swinging loads, buckets, booms etc.
		7) Equipment routes shall be designated.
		8) Spotters shall be used in this area.
		9) No vehicle will be loaded so as to obscure the driver's view ahead or to either side or to interfere with the safe operation of such a vehicle.

5.4 PHASE SAFETY PLAN

Job/Phase/Task	Hazards to be Controlled	Action to be Taken to Overcome Hazards
Stockpile Excavated Soils (continued)		10) Trucks will observe the designated speed limit(s) and will operate the vehicle in a non-wreckless fashion.
	Hazards from atmosphere and physical contact	1) PPE shall be required as outlined in Section 6.0.
		2) Ambient air monitoring for lead and pesticides shall be used to verify selection of PPE.
		3) Dust control shall be maintained.
	Dust generation	1) Soils stockpiled into rolloff containers or truck beds shall be kept covered with tarp/visqueen at all times while on site.
		2) A water spray shall be used to control dust generation as necessary during stockpiling operations.

5.5 PHASE SAFETY PLAN

JOB/PHASE/TASK	HAZARDS TO BE CONTROLLED	ACTION TO BE TAKEN TO OVERCOME HAZARDS
Perform Confirmation Sampling	Slips, trips, and falls	1) Work areas shall continue to be visually inspected and slip, trip, and fall hazards shall be marked, barricaded or eliminated as is feasible.
		2) Areas shall be kept neat and in an orderly state.
		3) Proper illumination shall be maintained in work areas.
	Strains from moving equipment	1) Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting back, getting help in moving bulky/heavy loads, and using mechanical equipment to move materials and equipment. See Exhibit V of this plan.
		2) Hand truck use shall be encouraged.
	Atmospheric and contact hazards	1) PPE shall be worn as outlined in Section 6.0 of this plan.
		2) Personnel shall limit contact with materials.
	Injury from the use of sampling equipment	1) Personnel shall be trained in the use of sampling equipment and the appropriate sampling procedure.

5.6 PHASE SAFETY PLAN

JOB/PHASE/TASK	HAZARDS TO BE CONTROLLED	ACTION TO BE TAKEN TO OVERCOME HAZARDS
Dispose of Drums	Injury from moving heavy loads/drums	1) Personnel shall use additional personnel and mechanical assistance when moving drums. Maintain a straight back, lift with legs, limit twisting, etc. when breaking drums. 2) Keep nonessential personnel out of the drum path/staging area to prevent injury.
	Pinching/cutting hazards	1) Personnel shall wear appropriate PPE (including protective gloves) while handling drums. 2) Avoid moving drums too heavy to control and maintain adequate space around drums to prevent pinches.

5.7 PHASE SAFETY PLAN

JOB/PHASE/TASK	HAZARDS TO BE CONTROLLED	ACTION TO BE TAKEN TO OVERCOME HAZARDS
Decontaminate Equipment	Atmospheric and contact hazards from chemical agents	1) PPE use shall be required. 2) Visual monitoring and acute symptoms of exposure shall be used to verify selection of PPE. 3) Minimize contact with contaminated materials.
	High pressure washer	1) High pressure washer safety procedure must be followed (see Section F of the FSM.) 2) Special PPE shall be donned (See Section F of the FSM.)
	Noise level hazards	1) Use appropriate PPE such as earplugs and/or muffs during high pressure washing operations as necessary.
	Slips, trips, and falls	1) Maintain good housekeeping in the area and observe all wet surfaces. 2) Provide adequate lighting in the work area.
	Strains from use of tools	1) Personnel shall maintain rational pace when using tools and shall be given adequate rest periods. 2) Tools shall be appropriate for the task and maintained in good condition. 3) Damaged tools shall be removed from service and tagged.

5.8 PHASE SAFETY PLAN

JOB/PHASE/TASK	HAZARDS TO BE CONTROLLED	ACTION TO BE TAKEN TO OVERCOME HAZARDS
Demobilize	Potential contact hazards from equipment and materials	1) All equipment will be decontaminated prior to being removed from the site. 2) PPE shall be used as required. 3) All general site chemical hazards and decontamination solution must be stored in the appropriate containers in the designated areas.
	Strains from manually moving equipment and materials	1) Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limited twisting, getting help in moving bulky/heavy loads, and using mechanical equipment to move materials and equipment. See Section H of the FSM for the safe lifting procedure. 2) Hand truck use shall be encouraged. 3) Personnel shall work at a rational pace.
	Slips, trips, and falls	1) Work area shall continue to be visually inspected and slip, trip, and fall hazards shall be marked, barricaded, or eliminated as is feasible. 2) Work area shall be kept neat and in an orderly state. 3) Proper illumination shall be maintained in work areas.

JOB/PHASE/TASK	HAZARDS TO BE CONTROLLED	ACTION TO BE TAKEN TO OVERCOME HAZARDS
Demobilize (continued)	Electrocution	1) Only qualified electricians shall be allowed to disconnect electrical circuits. 2) All extension cords shall continue to be inspected daily for structural integrity, ground continuity, and damaged areas. 3) Ground fault circuits shall be used on all 120 volt, 20 amp circuits.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Work on site will be accomplished primarily using two levels of protection, USEPA Levels D and C. The following supplemental protective clothing/equipment should be utilized as necessary to help control for cold stress on site:

- Cotton work gloves
- Insulated coveralls
- Hard hat liners
- Tyvek coveralls with hood

The following text summarized the levels of protection in detail.

6.1 LEVEL D - NO RESPIRATORY PROTECTION

Work in the support zone may be done in Level D PPE depending on results of initial and ongoing air monitoring.

Level D equipment consists at a minimum, of:

- Eye protection (safety glasses with side shields or goggles)
- Hard hats
- Safety shoes or boots (Steel toe/shank)

6.2 LEVEL C - FULL-FACE AIR PURIFYING RESPIRATORS

Some work in the exclusion zone, during intrusive activities where there is the potential for exposure to airborne contaminants (during excavation work), will require the use of Level C PPE. Level C equipment consists of:

- MSA "Ultra-twin" full-face respirator with GMC-H cartridges (provides protection against organic vapors, chlorine, hydrogen chloride, sulfur dioxide, dusts, fumes, mists, radon daughters, asbestos-containing dusts and mists, pesticides, and radionuclides.) Survivair 4200 equipped with 1093 cartridge and American Optical full-face "Commander" or "Seven Star" equipped with R53HE cartridges are acceptable equivalents.

- Hard hat (face shield for high-pressure washing)

- Cotton coveralls (inner, hot work)

- Regular Tyvek coveralls with hood (dry materials work); cannot be white or yellow in color, per client request

- Saranex-coated Tyvek coveralls with hood (wet material work)
- Leather, steel-toed and shank work shoes/boots
- Vinyl or latex booties over leather work shoes/boots
- PVC Robar or Neoprene Tingley outerboots over vinyl latex booties (for operations workers)
- Vinyl or latex inner gloves
- Cotton gloves (inner, as desired)
- PVC or Nitrile gloves (outer)
- Rain suits (required for high-pressure washing)
- Hearing protection (if necessary)

All joints between protective garments will be sealed with vinyl duct tape.

6.3 TASK-SPECIFIC PROTECTION LEVEL

Based on the evaluation of potential hazards, the following levels of PPE have been designated for the applicable work areas or tasks:

Task	Initial Level of Protection
Mobilize and set up	Level D
Perform soil sampling and analysis	Level C or D
Excavate contaminated soils	Level C
Stockpile excavated soils	Level C
Perform confirmation sampling	Level C or D
Dispose of drums	Level D
Decontaminate equipment	Level C or D
Demobilize	Level D

NOTE: Levels of protection may be upgraded or downgraded depending on air monitoring results and actual field conditions. All changes in the protection level must be approved by the Regional Manager of Health and Safety and the USACE on-site representative.

7.0 DECONTAMINATION PROCEDURES

Decontamination is accomplished to ensure the materials that personnel and equipment may have contacted in the exclusion zone are removed in the contamination reduction zone before passing into the support zone.

Decontamination areas will be located in the contamination reduction zone, which will vary from each site as determinations of exclusion zones are made. The decontamination area(s) will begin at the perimeter of the exclusion zone and end at the entrance to the support zone.

7.1 PERSONNEL DECONTAMINATION PROCEDURES--LEVEL C

- Deposit any equipment used on site in a segregated area prior to entering the contamination reduction zone. This segregation reduces the possibility of cross contamination.

- At the perimeter of the exclusion zone, rain gear or splash protection (if worn) should be damp-wiped or wet sprayed to remove any adhered particles. The effort will eliminate any exposure to support personnel and workers themselves during the PPE removal process (doffing).

- Robar/Tingley boots are to be scrubbed with a detergent-water solution. The boots will then be removed and placed on a rack for drying.

- Hard hats are to be removed and hung up. On a daily basis, these are to be scrubbed with a detergent-water solution.

- Outer gloves are to be cleaned and removed, and depending on condition, may be disposed in the solid wastestream (if damaged or uncleanable).

- Splash gear is to be removed, cleaned, and hung up to dry (if worn).

- Tyvek suits are to be removed and disposed of in the solid wastestream.

- Respirators are to be removed and prepared for reuse or decontaminated.

- Vinyl booties are to be removed and disposed of in the solid wastestream.

- Sample gloves are to be removed and disposed of in the solid wastestream.

- Each person is to wash his or her hands, arms, neck, and face.

7.2 SUSPECTED CONTAMINATION

Any employee suspected of experiencing skin contact with contaminated materials is to remove all clothing, shower, and don clean clothes. Following this, he/she must report to the site supervisor and/or HSO.

7.3 PERSONAL HYGIENE

Before eating, smoking, or drinking, personnel must wash hands, arms, neck, and face. Personnel may be required to shower before leaving the project area at the end of each day's activity. Personnel not required to shower on site should do so immediately upon arrival to the motel at the end of the work shift.

7.4 EQUIPMENT DECONTAMINATION

Any equipment, vehicles, or tools that have entered an exclusion zone must be cleaned prior to removal. Some equipment decontamination may require pressurized water or steam cleaning. All water and material must be collected and placed in the designated waste disposal area. All diaphragm pumps, if used, are to be disassembled and cleaned thoroughly. These pump components may be sent to Findlay, Ohio, disassembled after having been cleaned; however, they should be collected for shipping as one parcel.

Following this cleaning, all items are to be inspected and approved by the site supervisor prior to removal from the area.

7.5 OTHER DECONTAMINATION PROCEDURES

7.5.1 General

All liquids and disposable clothing are to be treated as contaminated waste and disposed of properly. Personnel handling contaminated waste must wear Level C protection. Equipment must be cleaned prior to demobilization. Washwaters and residues must be collected for treatment and/or proper disposal.

7.5.2 Vehicles and Heavy Equipment (Yellow Iron)

- Scrape or brush off gross residues
- Pressure wash outside of equipment paying particular attention to tires and tracks
- Vacuum (HEPA) and wipe down interior
- Clean windows with "Windex" and paper towels

- Remove belly pan (Yellow Iron)
- Dispose of residues and clean surfaces (Yellow Iron)
- Return assembled if possible; if not, then return unassembled to Findlay, Ohio (Yellow Iron)
- Contact resource manager to report equipment status and for dispatch

7.6 DECONTAMINATION WASTES GENERATED

All liquid wastes generated during decontamination procedures (i.e., aqueous and non-flammable organic solvent rinses) must be collected and temporarily stored at the soil staging areas. Personnel must recognize the need for generation of these wastestreams to be kept at a minimum throughout the project. Solid wastes shall be drummed or incorporated into other solid wastestreams for proper disposal.

7.6.1 Collection Procedures for Decontamination Wastes

All solid wastes must be collected in garbage bags and placed in 55-gallon drums (or other container as specified by disposal firm) for eventual disposal.

The liquid wastes must be collected in drums and temporarily staged in the soil staging areas. For personnel decontamination, the rinsate is to be contained in the boot and glove wash/rinse stations and then collected in drums for addition (to be staged) into the soil staging areas. For equipment decontamination, the rinsate is to be collected at the decontamination pad sumps and collected in drums for temporary staging in the soil staging areas. Treatment and disposal for these materials must be performed in a manner suitable with the compliance of RCRA 90 day disposal period.

7.7 EMERGENCY DECONTAMINATION

In addition to routine decontamination procedures, emergency decontamination procedures must be established. In an emergency, the primary concern is to prevent the loss of life or severe injury to location personnel. If immediate medical treatment is required to save a life, decontamination should be delayed until the victim is stabilized. If decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been exposed to corrosive material, decontamination must be performed immediately. If an emergency due to a heat-related illness develops, protective clothing should be removed from the victim as soon as possible to reduce the heat stress. During an emergency, provisions must also be made for protecting rescue, first aid, or medical personnel from hazardous materials and for disposing of contaminated clothing and equipment.

- If decontamination can be done:
  - Wash, rinse, and/or cut off protective clothing and equipment.
- If decontamination cannot be done:
  - Wrap the victim in blankets or plastic to reduce contamination of other personnel.
  - Alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures if necessary.
  - Send along site personnel familiar with the incident.

7.7.1 Emergency Decontamination Equipment

The following equipment shall be readily available for emergency decontamination:

- Tyvek coveralls
- Nitrile gloves
- Soap and water
- Visqueen
- Towels
- Eyewash station
- Spare coveralls

8.0 RESPIRATORY PROTECTION

Respiratory protection is required to protect personnel from inhalation hazards during certain project operations.

8.1 AIR-PURIFYING RESPIRATORS

Air-purifying respirators for this project will be MSA "Ultra-twin" full-face equipped with GMC-H cartridges.* The GMC-H cartridge provides protection against organic vapors, chlorine, hydrogen chloride, sulfur dioxide, dusts, fumes, mists, radon daughters, asbestos-containing dust and mists, and radionuclides.

*Survivair 4200 equipped with 1093 cartridge and American Optical full-face "Commander" or "Seven Star" equipped with R53HE cartridges are acceptable equivalents. Survivair 1091, American Optical R51HE, and MSAGMA-H are also acceptable equivalents; however, these cartridges do not carry a NIOSH approval for acid gases and pesticides.

8.2 CARTRIDGE CHANGES

All cartridges are to be changed a minimum of once daily; however, dusty or wet conditions may necessitate more frequent changes. Personnel are to change cartridges if breakthrough odors are detected or if resistance to breathing is substantially increased.

8.3 INSPECTION AND CLEANING

Respirators are to be checked weekly by the site supervisor or HSO and before each use by the wearer. All respirators and associated equipment must be decontaminated and hygienically cleaned daily. Respirators must be stored in sealed bags or lockers at the conclusion of each day's activity.

8.4 FACIAL HAIR

No worker who has facial hair that interferes with the respirator's sealing surface will be permitted to wear a respirator or work in the exclusion zone.

8.5 FIT TESTING

All workers have been fit tested with either isoamyl acetate or irritant smoke. Each time a worker dons a respirator, it is that worker's responsibility to perform a negative and positive pressure fit test.

8.6 CORRECTIVE LENSES

Normal eyeglasses may not be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators will be provided. Contact lenses shall not be worn with any type of respirator.

9.0 ENVIRONMENTAL MONITORING

The purpose of air monitoring at this project is to measure and/or quantitate emissions/ exposures both within the work areas and at the perimeter of the area. Specifically, the intent of air monitoring during this project is to:

- Ensure the safety of on-site personnel
  - One person performing intrusive operations where there is a potential for exposure to lead will be monitored to ensure compliance with 29 CFR 1910.1025.
- Ensure the safety of people who are not on site; but who are in the downwind vicinity of the area.
  - Samples are to be taken at the perimeter of the excavation area
  - All visible emissions of dust must be suppressed.

Refer to the Air Sampling Plan, included as Exhibit X for details of air monitoring.

Unless already wet, excavation areas must be pre-wetted to prevent visible dust emissions. If visible dust emissions can be seen emanating from the excavation site, the emissions control procedures shall consist of suppression by spraying a water mist into the air until dust has settled and cannot be seen visually.

9.1 AIR MONITORING METHODOLOGIES

Time integrated sampling shall be used to characterize the ambient air at the project site.

9.1.1 Time Integrated Sample Collection

The air sampling method, NIOSH Method 7082 for lead shall be used and requires the use of personal air sampling pumps fitted with 37 mm MCE filter cassettes. Personnel air sampling for pesticides will be performed under EPA 1P-8 method, using polyurethane foam (PUF) sampling tubes. The results of sampling are averaged over time for comparison with the OSHA-PEL.

9.2 EQUIPMENT REQUIREMENTS

The following sections identify the equipment that is necessary for air monitoring at and during this project.

9.2.1 Personal Air Sampling Pumps

These instruments are precision air pumps that can be set at a desired flow rate to capture air samples on an attached collection device. When used to collect air samples over a long period of time, large volumes of air can be obtained to detect various chemicals at lower concentrations than real-time instrumentation. Air sampling pumps are also useful for time-integrated sampling and expression of results as TWA. The analytical results are often more analyte specific than with real-time monitoring. These pumps are to be used for quantitating the concentrations of lead and arsenic in the ambient air to monitor personnel exposures. Personal samples are to be collected in the breathing zone of personnel. Refer to the Air Sampling Plan for additional information.

9.2.2 Perimeter Air Sampling Pumps

Refer to the Air Sampling Plan, which is Exhibit X to the CSAP.

9.3 POSTING OF AIR MONITORING RESULTS

All personal air monitoring results will be posted in the break area and the on-site office trailer if they are available within the time constraints of the project duration.

9.4 FUGITIVE DUST EMISSIONS

In order to maintain environmental air quality, the excavation area will be pre-wetted to prevent visible emissions of fugitive dust. If visible emissions are observed in the work area, work will shall cease until dust is suppressed.

9.5 X-RAY FLUORESCENT MONITORING

The XRF method will be utilized during site operations at this project, (excavation areas, etc.) to determine the presence of lead in the soil.

This method uses X-radiation to excite the sample atoms and then determines the identity and quantity of material(s) present. The following health and safety precautions shall be followed during all XRF sampling:

- Become familiar with the instrument before use.
- Do not initiate sample analysis unless probe is connected and sample is in place.
- Do not remove or adjust samples while the instrument is conducting analysis.
- Avoid contact with the top of the probe.
- Never aim the probe at any person, including the user himself/herself.

- Perform necessary repairs immediately when feasible. Serious repairs should be performed by the instrument's manufacturer or other qualified source.

9.6 AIR MONITORING ACTION LEVELS

Table 9.1 describes the air monitoring action levels:

TABLE 9.1

AIR MONITORING ACTION LEVELS

Monitoring Device or Analyte	Action Level	Action
Visual	Visible emissions emanating from the excavation perimeter	Stop work; suppress dust emissions; proceed with caution.

9.7 AIR MONITORING FREQUENCY

Table 9.2 documents the monitoring instruments which will be used on-site at the specified intervals.

TABLE 9.2

AIR MONITORING FREQUENCY

Instrument	Frequency of Use
Time Integrated Sampling (personal sampling pumps)	One employee performing intrusive activities involving lead and pesticide contaminated soils will be sampled for these contaminants for the duration of those activities (approximately 1 day each).

9.8 FIELD CALIBRATION OF AIR SAMPLING PUMPS

Air sampling pumps shall be calibrated with a primary flow measuring device prior to and after sample collection.

10.0 GENERAL SAFETY

This section outlines general safety topics not addressed elsewhere in this plan.

10.1 SAFETY INSPECTION CHECK-OFF SHEET

The site supervisor, assisted by the HSO is to make a weekly inspection of the site using OHM's Safety Inspection Project Site Form (see Exhibit XI). The site supervisor must then ensure that all unsafe conditions found during this inspection are corrected.

10.2 SAFETY RE-EVALUATION

As conditions change, the site supervisor may institute more or less stringent procedures than those outlined in this plan. Any reduction of safety will be implemented only after consultation with the Regional Health and Safety Manager and approval by the USACE on-site representative.

10.3 PARKING

Parking will be permitted only in designated areas as specified by the USACE on-site representative.

10.4 ACCIDENT INVESTIGATION

All accidents or incidents will be reported and investigated as appropriate in accordance with OHM established procedures (see Exhibit XII).

10.5 ILLUMINATION

Areas accessible to employees shall be adequately lighted to intensities as specified in 29 CFR 1926.65(m) Table H-120.1 while any work is in progress.

10.6 SANITATION

Sanitation requirements pertaining to potable water, nonpotable water, toilet facilities, food handling, temporary sleeping quarters, washing facilities, and shower/ change rooms, as specified in 29 CFR 1926.65 (n) must be adequately addressed.

10.7 SAFETY AND HEALTH POSTER

Federal OSHA requires that Health and Safety Poster #2203 be displayed at all times. This poster is to be located in the project office trailer, where employees can are given opportunity to review it. A poster is included as Exhibit XIII of this plan.

10.8 COMPLIANCE WITH 29 CFR 1926.65

The OSHA regulations, "Hazardous Waste Operations and Emergency Response," must be fully complied with. All site personnel are encouraged to read this regulation. Deficiencies in compliance with the contents of this regulation should be brought to the attention of the site supervisor, HSO, or the OHM Midwest Region Health and Safety Manager. All deficiencies must be addressed immediately.

11.0 TRAINING PROGRAM

Training is required by federal law to be given to all personnel that work at this project location. Training is also fundamental for personnel to become proficient in techniques that enhance personal safety, work productivity, and project quality.

11.1 OHM EMPLOYEES

All OHM employees are to have received a 40-hour training session or will have been qualified by experience as required by 29 CFR 1910.120(e), [same as 29 CFR 1926.65(e)], "Hazardous Waste Operations and Emergency Response" and SARA Regulations prior to performing any work at this project site. Site supervisors receive an additional 8 hours of training and all personnel are to attend an 8-hour annual refresher training course.

11.2 EMPLOYEE TRAINING

Employee training covers:

- Review of 29 CFR 1910.120
- Hazard communication program
- Physical, chemical, toxic properties of hazardous materials
- Decontamination procedures
- PPE--donning, hazards, risks
- Respiratory protection
- Hearing conservation
- Hazardous substance spill response
- Confined space entry
- Excavation safety
- UST procedures
- Waste generation, storage, treatment, and disposal
- OSHA compliance/compliance with regulations
- Emergency event planning
- Shock sensitive and explosive materials
- Heat stress, cold stress
- Medical surveillance
- Heavy equipment/hand tool safety

11.3 JOB SITE TRAINING

Before commencing this project, a training session will be held to cover project-related topics. For this particular project topics would include, bur are not limited to the following:

- History of the site(s)

- Names of personnel and alternates responsible for safety and health
- Chemicals used or found on site and their hazards (signs and symptoms of exposure)
- Physical hazards involved with the site operations
- Site control
- Work zones--locations of exclusion, contamination reduction, and support zones
- Heavy vehicles
- Passenger vehicle safety
- Levels of protection--C or D
- Decontamination procedures
- High-pressure washer safety procedures
- Excavation safety
- Using hand tools
- Emergency procedures, signals, and equipment
- Electrical and lighting safety
- Medical surveillance requirements
- Work area rules

11.4 DAILY SAFETY MEETINGS

A safety meeting is to be held daily before work commences. The scope of work for the day, hazards of the work, hazards of the materials, use of respirators, decontamination, and hazardous areas of the project will be discussed. Periodically, general subjects such as electrical safety, defensive driving, and heat/cold stress should be discussed.

11.5 RECORDS

All training sessions, topics, attendance, training officer, and date of training is to be recorded in a safety training logbook. This logbook shall remain at the work location until completion of the project.

11.6 PRE-PHASE TRAINING

Before a new phase of work is begun in an area with which the crews are not familiar, a training session is to be held covering the chemical and physical hazards related to this particular phase/area.

12.0 MEDICAL SURVEILLANCE

The OHM Medical Surveillance Program is established to ensure that the health of employees is not compromised by potential exposure to chemical or physical agents found at work locations.

12.1 GENERAL

All OHM field personnel and/or subcontractors working on an OHM project must participate in a stringent medical monitoring program as directed in 29 CFR 1926.65(f). The physical, repeated annually, qualifies personnel to work around potentially hazardous substances and safely wear respiratory protection. This physical examination consists of the following:

- Occupational and medical history
- Physical examination
- Visual test
- Audiometric test
- Urinalysis
- Blood test
- Chest x-ray
- Pulmonary functions test
- EKG or EKG stress test (as required)
- Written report

12.2 ANNUAL MEDICAL EXAMINATION

Annual examinations include an updated medical history, including any occupational exposure from the previous year, and a detailed physical examination featuring the same components as the pre-employment examination. The physician pays particular attention when comparing the biochemical parameters to help ensure no recognized symptoms of toxic exposure have developed during the past year. The physician completes and signs the medical certification/rejection section. A written report of the occupational and medical history, physical examination, and all laboratory work is required.

12.3 EXIT MEDICAL EXAMINATION

An exit medical examination is required for termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 3 months. A written report of the occupational and medical history, physical examination, and all laboratory work is required.

12.4 SUBCONTRACTORS

If a subcontractor is hired in any phase of the project, the company is also required to abide by 29 CFR 1926.65(f) Medical Surveillance Program and OHM policy. Employees of the subcontractor must have a pre-employment physical examination or an examination within the last 12 months to be eligible to work on site.

12.5 ACCESS TO MEDICAL RECORDS

Employees have the right to review personal medical records collected as a result of this surveillance program. A copy of these records will be provided within 15 days of request. Please direct requests to Mark Harber, R.N., located in the Corporate Health and Safety Department (Findlay, Ohio).

13.0 EMERGENCY PROCEDURES

Written standard operating procedures are developed for emergency events. These procedures detail appropriate actions for fire, medical, and personnel exposure events. The following subsections detail specific emergency guidelines and information for this project. OHM will provide its own emergency response when feasible. Emergencies that exceed the capabilities of OHM personnel and equipment will require additional support form agencies designated below.

13.1 EMERGENCY TELEPHONE NUMBERS

The following emergency telephone numbers shall be prominently posted near each telephone:

▸ Ambulance Service	913-239-7835
▸ Police (military)	312
▸ Fire (Fort Riley Fire Department)	317
▸ Hospital Irwin Army Community Hospital	913-239-7778 913-239-7777
▸ Chemical--Oil Spills Cleanup (National Response Center)	800-424-8802 202-462-2657
▸ Chemtrec	800-424-9300
▸ Center for Disease Control	404-488-4100 (24 hour)
▸ Poison Control (Omaha, Nebraska)	800-642-9999

13.2 EMERGENCY MAP

A map showing the route to the hospital will be posted near the telephone on site. The written description of the route including actual distance and travel time will be determined upon mobilization to the site.

13.3 EMERGENCY EQUIPMENT

In each operative decontamination area, an emergency equipment station will be set up and will consist of an eyewash station, a first-aid kit (which meets the requirements of 29 CFR

1926.50), emergency alarm (signal), fire blanket, and two 20-pound ABC fire extinguishers. The eyewash units will be located near the source of potential hazard. Each station will be prominently marked.

13.4 EMERGENCY SIGNALS/EMERGENCY ALARMS

The emergency signal consists of intermittent 5 second blasts (medical) or a continuous 30-second blast (fire) on a hand-held air horn. Horns will be located at the outer perimeter of the contamination reduction zone. In the event of an emergency and the horn sounds, operations will be shut down and all personnel will assemble in the contamination reduction zone, be accounted for, and given directions on how to proceed by the site supervisor or, in his absence, by the HSO. If an obvious catastrophic emergency warrants rapid egress from all areas, personnel shall exit the areas and assemble in a designated zone upwind of the emergency. This system is a requirement of OHM policy for all locations and it should be reviewed at least weekly in a daily safety meeting.

13.5 EMERGENCY RESPONSE CONTINGENCY PLAN

When either intermittent 5 second blasts (medical) or a continuous 30-second blast (fire) is sounded, all personnel should evacuate the exclusion zone and proceed to the CRZ quickly. These blasts can be carried out on a hand-held air horn located at the outer perimeter of the CRZ.

13.5.1 Emergency Routes

In an emergency, all personnel will exit through CRZ corridor and assemble in CRZ, upwind, if possible, from the exclusion zone. In an obvious catastrophic emergency, personnel should exit the exclusion zone at nearest exit and assemble in an area designated by the site supervisor upwind of the emergency.

13.6 "BUDDY" SYSTEM

All work in the exclusion zone that involves handling hazardous materials or is otherwise hazardous is to be done using the "buddy" system. Prior to entering the exclusion zone, buddies are to be assigned. Buddies are responsible for ensuring the safety of their respective buddies and should be aware of the potential for exposure to materials found on site and general hazards of the workplace. Buddies shall remain within visual sight of each other at all times.

13.7 EMERGENCY COORDINATOR

The designated emergency coordinator will be the site supervisor. In his/her absence the duties would be assumed by the HSO. If the HSO is not present, then the duty falls to the general foreman.

The duties of the emergency coordinator are as follows:

- Initially alert emergency service agencies such as fire and police departments and ambulance services that site operations are occurring, nature of project, site orientation, descriptions of PPE, and possible site events that may require their intervention. These agencies should be contacted once OHM personnel arrive on site.

- Review emergency procedures with all site personnel. This will include the initial site orientation and a review once weekly during site-safety meetings.

- Ensure that emergency contingency plans remain up to date. As site conditions change, these plans may need to be altered. As the contingency plans change, updates to emergency service agencies may be required.

- Establish predetermined evacuation areas (upwind as necessary).

- Coordinate emergency response procedures as required.

- Ensure that practice runs are conducted along emergency routes periodically.

13.8 MEDICAL EMERGENCY AND PERSONAL INJURY

In any life-threatening situation, the safety of the individual takes precedence over all procedures designed for protection against chemical contamination on site. When the site supervisor is unavailable, the HSO shall assume the emergency coordinator role. At least two OHM personnel certified in first aid/CPR will be on site during work operations.

13.8.1 Worker Procedure

The first worker who notices that a medical emergency or personal injury has occurred shall immediately make a subjective decision as to whether the emergency is life-threatening and/or otherwise serious.

13.8.2 Life-Threatening and/or Otherwise Serious Incident

If an apparent life-threatening and/or otherwise serious incident has occurred, the first person who identifies the situation shall sound the alarm to summon the site supervisor to the contamination reduction zone (intermittent 5-second blasts repeated until the site supervisor arrives). The site supervisor shall be apprised of the situation and told where the victim(s) is/are located. As the site supervisor proceeds to the accident scene, the HSO shall be summoned and communication channels shall be opened and kept on standby until the HSO has:

- Surveyed the scene
- Performed a primary survey of the victim

The site supervisor shall then determine if the Emergency Medical Services (EMS) should be summoned, what information must be relayed, and provide emergency action principles consistent with the injury. The site supervisor shall appoint a staff person or persons who will meet the EMS and have them quickly taken to the victim. If necessary, decontamination of the individual shall be performed at the direction of the site supervisor.

13.8.3 Nonlife-Threatening Incident

Should it be determined that no threat to life is present, the worker shall assist the injured person to the contamination reduction zone and contact the site supervisor or HSO.

13.8.4 Other Procedures

The area surrounding any serious accident is not to be disturbed until any changes to the site have been cleared by the site supervisor. The site supervisor shall immediately investigate the causes of all OSHA recordable accidents. Lost time injuries shall immediately be reported to the vice president of the Midwest Region.

13.9 FIRE EMERGENCY

Because of the possible presence of flammable materials on site, fire is an ever-present hazard. OHM personnel are not trained, professional firefighters. If there is any doubt that a fire can be quickly contained and extinguished, personnel are to sound the fire alarm and vacate the structure or area. The local fire department will be notified of the potential hazards at this project prior to the start of any work. The specific date and time of notification will be determined during the pre-construction meeting for this project. The following procedures will be used in the event of a fire.

13.9.1 Sound the Alarm

Anyone who sees a fire shall sound the alarm. The alarm is a 30-second blast on an air horn.

13.9.2 "Buddy" for Each Worker

Work crews shall be comprised of pairs of workers. Workers shall leave the work site with their respective "buddies" immediately after hearing the fire alarm.

13.9.3 Contained and Extinguished Fire

In the event of a small fire that the worker extinguishes, the on-scene foreman is to be summoned and the site supervisor is to be notified. All fires must be reported to the HSO and site supervisor.

13.9.4 General Alarm Response

On hearing the general alarm, the workers are to disconnect any electrical equipment in use (if possible), turn off combustion engines, and proceed to the nearest fire exit egress point.

13.9.5 Egress Instructions

Before workers begin operations in an area and on a daily basis, the site supervisor will give instructions on egress procedures and assembly points.

13.10 SPILL CONTAINMENT PROGRAM

The procedures defined below comprise the spill containment program in place for activities on site.

13.10.1 Fuel Spills

At times, there will be quantities of fuel on site that, if spilled, could have adverse environmental impact.

13.10.2 Measures for Preventing Fuel Spills

- Care shall be taken when transferring fuels.
- A containment dike around the fuel storage tanks shall be constructed.
- Inspect all fuel storage tanks for leaks daily.
- Inspect containment structure daily.
- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equipment (polypropylene absorbent pillows and sausages.) will be stationed in the immediate area. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.
- Fire extinguishing equipment meeting 29 CFR part 1910, subpart L shall be on hand and ready for use to control fires.

13.10.3 Response

Because OHM will be providing its own emergency response with respect to spills, the response time will be immediate. The proper authorities shall be notified as soon as is feasible.

The following response procedures for a diesel fuel spill of greater than 5 gallons will be used:

- Shut down operation in immediate area
- Limit ignition sources
- Suppress vapors as required
- Survey area with CGI/don protective equipment
- Pump liquids into drums
- Recover contaminated solids and place in containers
- Finish cleanup of residues

13.10.4 Notification

- OHM personnel--Project Manager
- USACE representative
- Other regulatory agencies as required

13.11 EVACUATION/RE-ENTRY

In all situations, when an on-site emergency results in evacuation of the exclusion zone, personnel shall not re-enter until:

- The conditions resulting in the emergency have been corrected.
- The hazards have been reassessed.
- The SSHP has been reviewed.
- Site personnel have been briefed on any changes in the SSHP.

Memo

OHM Corporation

16406 U. S. Route 224 East Findlay, Ohio 45840

Midwest Region

TO: Phil Conner, Project Manager

FROM: Bill Thomas

DATE: January 20, 1994

SUBJECT: Employee blood lead monitoring
Ft. Riley, Kansas Project #15480

This memo is issued as an addendum to the Site-Specific Health and Safety Plan for Soil Excavation in Ft. Riley, Kansas, Project #15480.

Based on an evaluation of the potential for employee exposure to lead during excavation work, and the provisions of the Occupational Safety and Health Administration (OSHA) standard for lead exposure, employee blood lead levels will not be evaluated during this project for the following reasons:

1. Employees involved in previous lead projects have been monitored and there is existing historical data documenting their blood lead levels.

2. The lead excavation work will be of short duration; it is expected to run less than one week.

3. The levels of lead in the soil are low, such that it is not anticipated that airborne lead levels will exceed the action level set by the OSHA General Industry Standard.

4. Personnel air monitoring will be performed during lead excavation activities to document the airborne levels of lead.

5. Personnel working in the exclusion zone during lead excavation activities will be wearing appropriate skin and respiratory protection, including a full-face air-purifying respirator with combination cartridges.

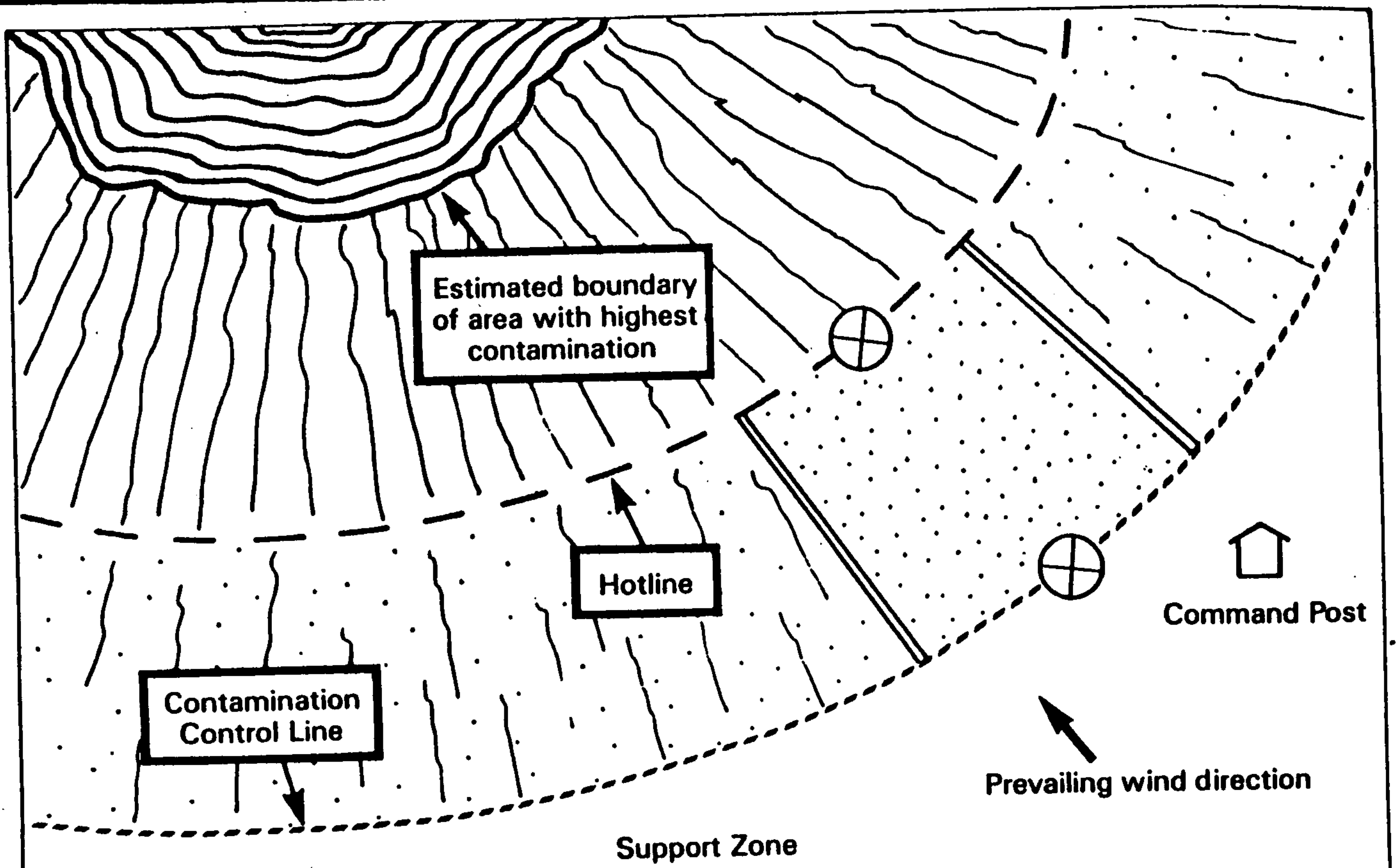
The issue of blood lead monitoring has been discussed with the United States Army Corps of Engineers' representative, Jim Woolcott, and he is in agreement with the decision not to conduct blood lead monitoring, based on the information contained in this memo.

EXHIBIT I

SITE MAPS

OHM CORPORATION FINDLAY, OHIO	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER

PLOT SCALE: 1" = 1"



Access Control Points.

Contamination Reduction Corridor.

Contamination Reduction Zone (CRZ).

Exclusion Zone.

Note: Area dimensions not to scale. Distances between points may vary.

FIGURE 1
WORK ZONES

OHM Corporation

PLOT SCALE: 1" = 1"

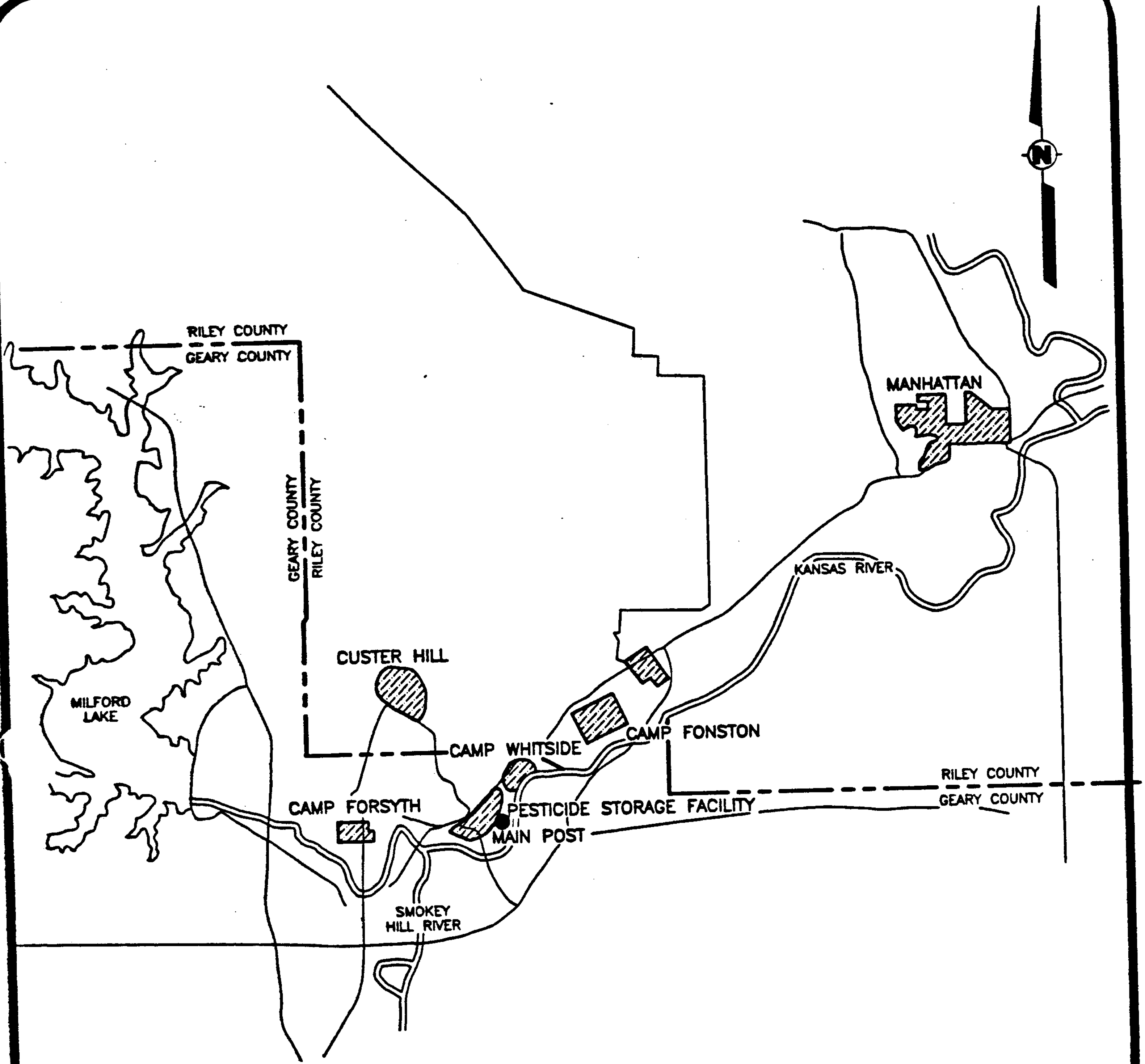
	OHM CORPORATION FINDLAY, OHIO	DRAWN B.	CHECKED BY	APPROVED BY	DRAWING NUMBER

N

FIGURE 2

SITE MAP

OHM Corporation



General Notes:

SCALE

0 3 6 MILES

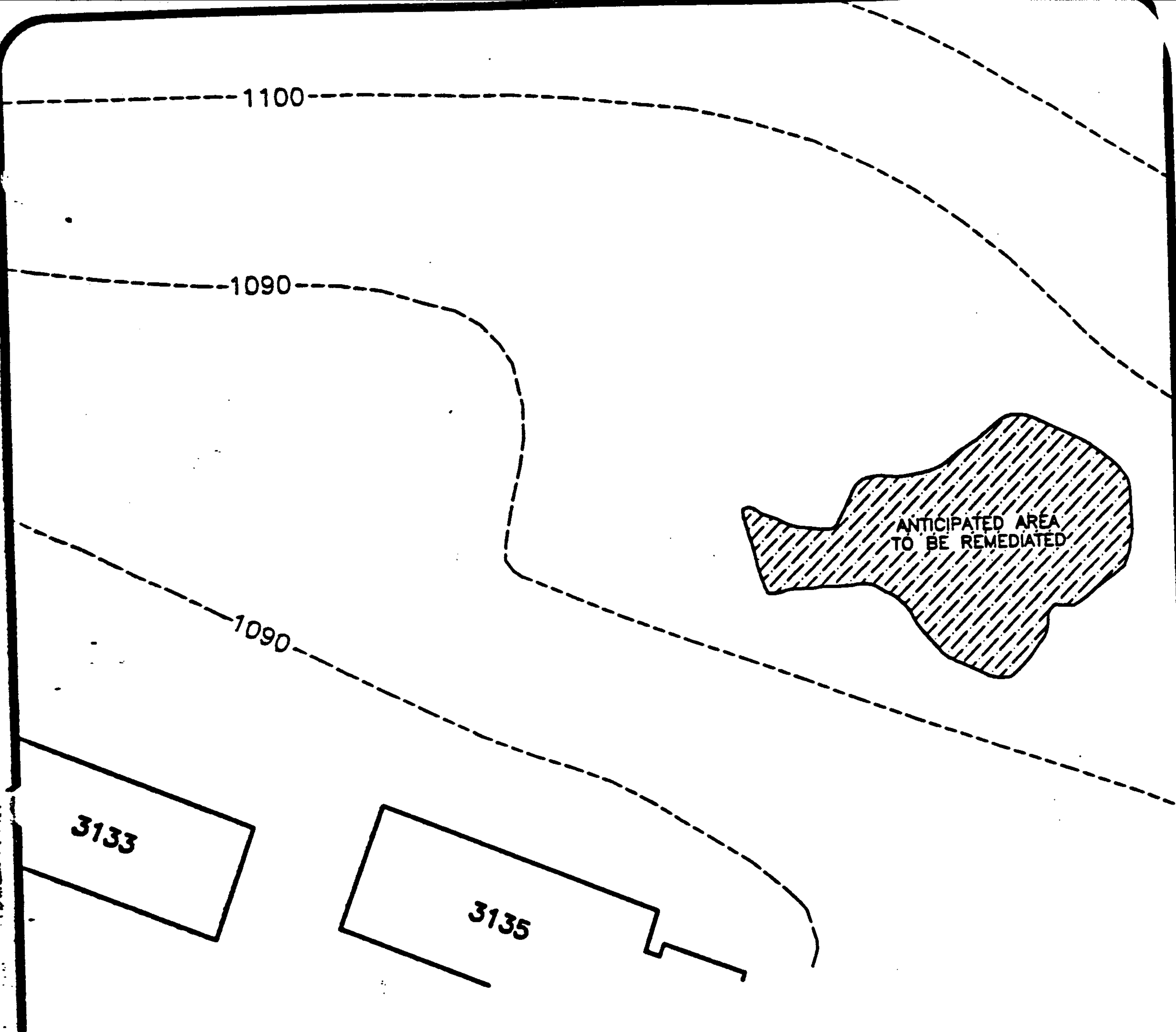
FIGURE 1.1

SITE MAP

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: APPROXIMATE	Drawing No: 15480-A1



General Notes:

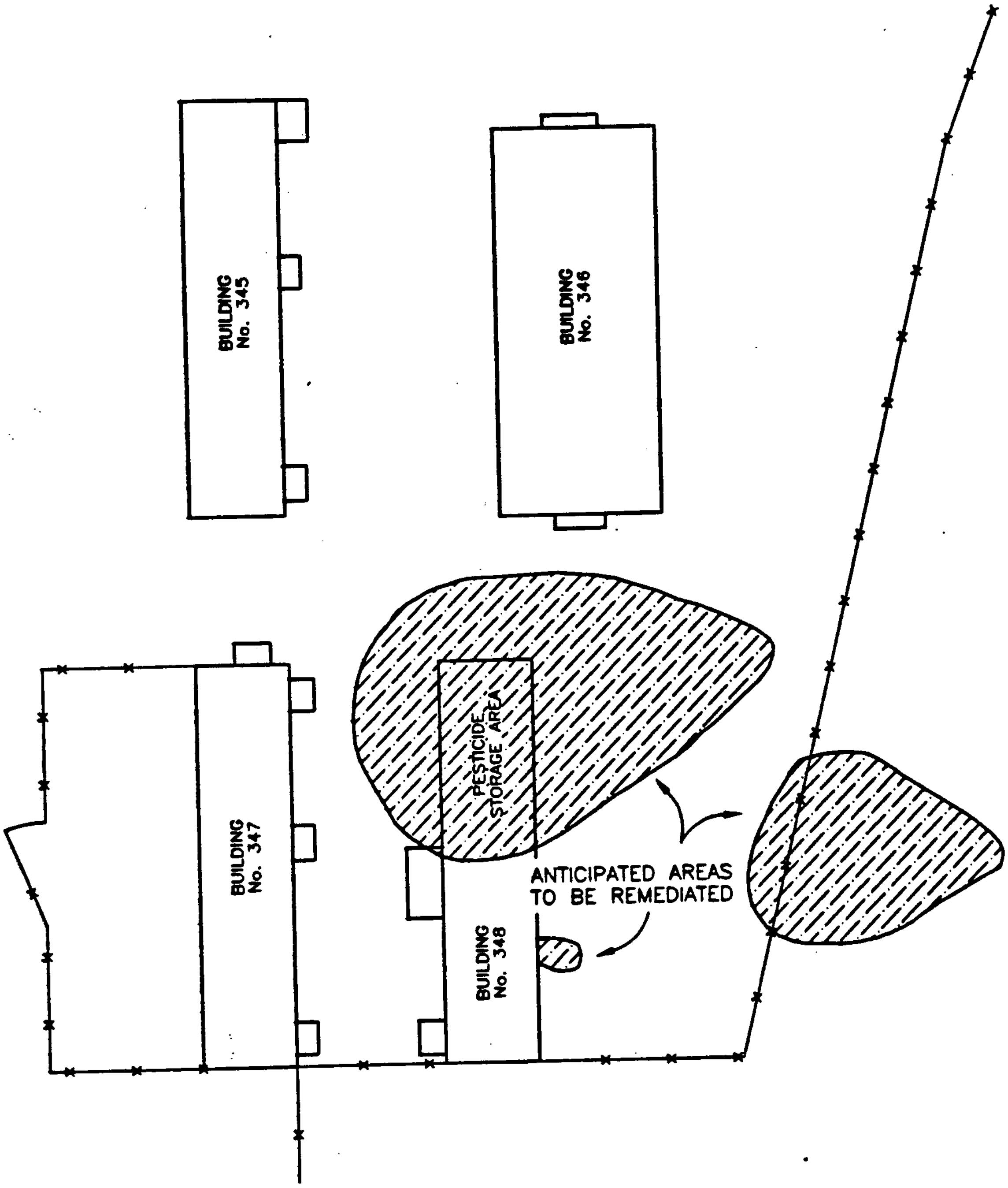
FIGURE 1.2

ANTICIPATED AREA TO BE REMEDIATED AT THE COLYER MANOR SITE

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: NONE	Drawing No: 15480-A3



General Notes:

FIGURE 1.3

ANTICIPATED AREAS TO BE REMEDIATED FOR THE PESTICIDE STORAGE FACILITY

FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 1-4-94	Approved By:
Scale: NONE	Drawing No: 15480-A2

OHM CORPORATION
FINDLAY, OHIO

DRAWN

CHECKED BY

APPROVED BY

DRAWING NUMBER 10 ...-A3

PLOT SCALE: 1" = 1"

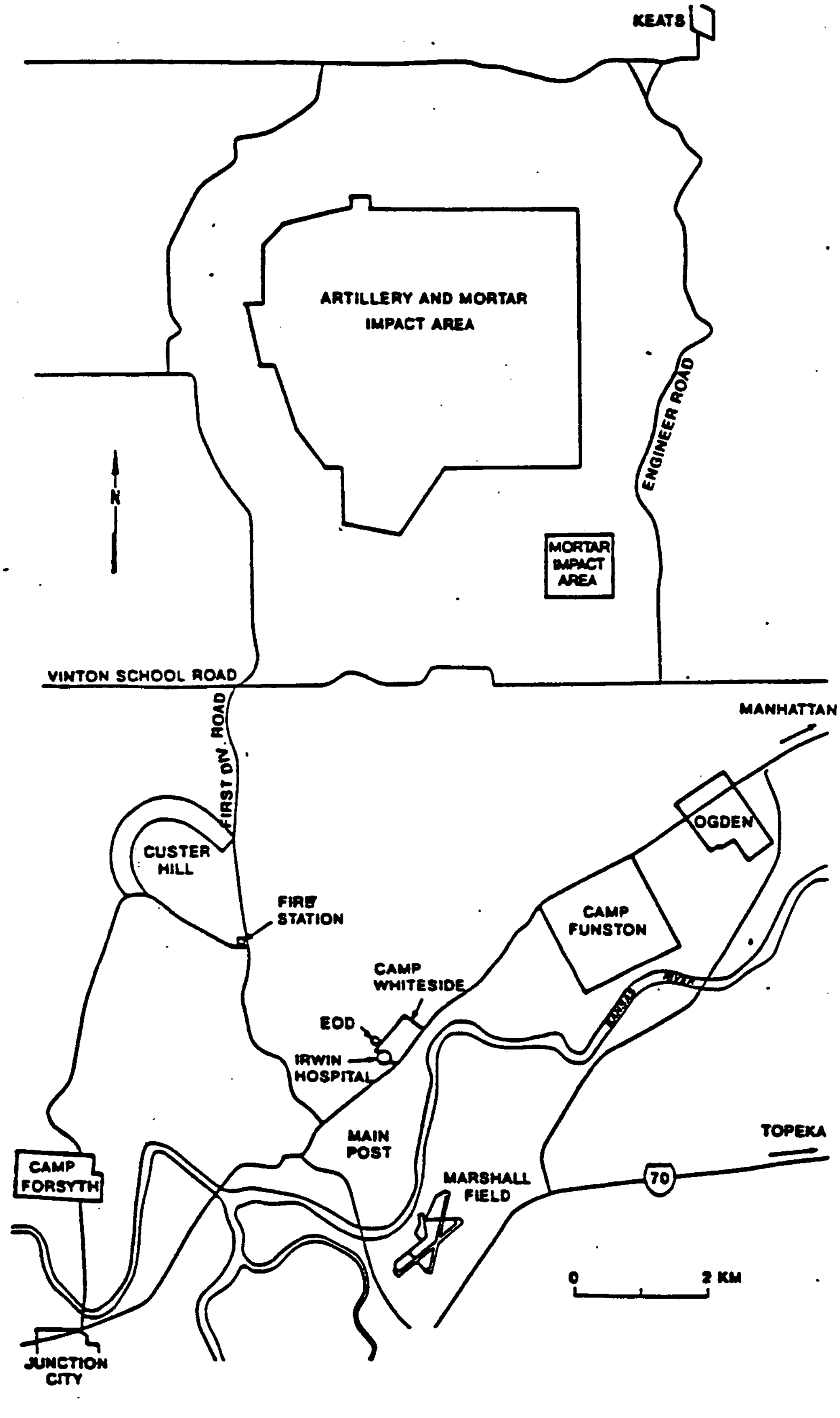
FIGURE 3

HOSPITAL MAP

TO BE PROVIDED AT SITE

OHM Corporation

Exhibit 6.2: Fort Riley Military Reservation



OHM CORPORATION
FINDLAY, OHIO

DRAWN BY

CHECKED BY

APPROVED BY

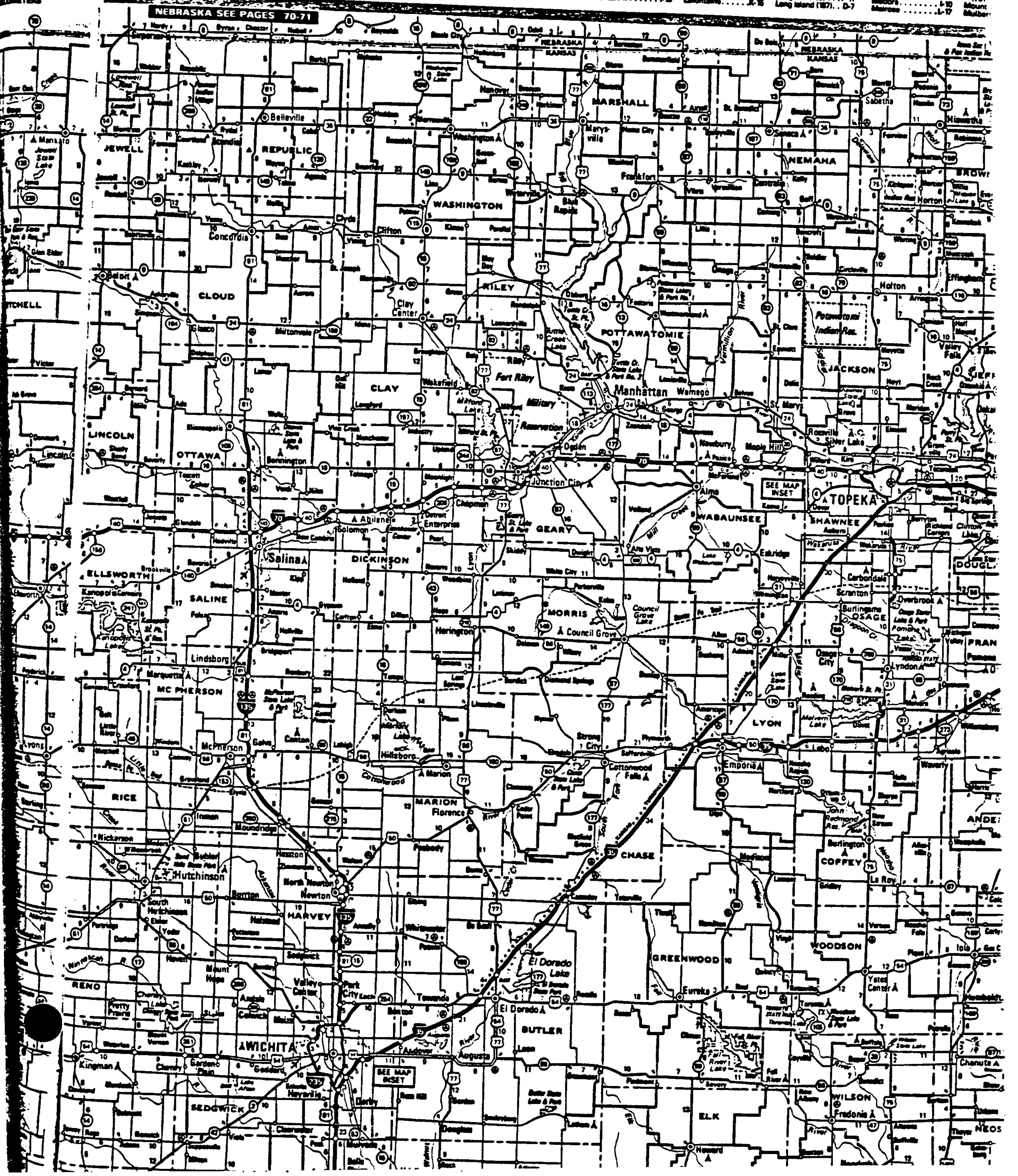
DRAWING NUMBER 1012

PLOT SCALE 1" = 1"

FIGURE 4

MAP TO SITE

OHM Corporation



NEBRASKA SEE PAGES 70-71
NEBRASKA
KANSAS
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REPUBLIC
WASHINGTON
MARSHALL
NEMAHA
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RILEY
POTTAWATOMIE
JACKSON
CLAY
LINCOLN
OTTAWA
ELLSWORTH
SALINE
DICKINSON
GEARY
WABAUNSEE
SHAWNEE
MORRIS
OSAGE
MC PHERSON
MARION
LYON
CHASE
RICE
HARVEY
RENO
BUTLER
GREENWOOD
COFFEY
WOODSON
SEDGWICK
ELK
WILSON
Belleville
Concordia
Clay Center
Manhattan
Junction City
Abilene
Salina
TOPEKA
Council Grove
McPherson
Emporia
Hutchinson
Newton
WICHITA
El Dorado
Marysville
Washington
Holton
Lindsborg
Kingman
Augusta
SEE MAP INSET

EXHIBIT II

WORKER/VISITOR ACKNOWLEDGMENT

WORKER/VISITOR ACKNOWLEDGMENT TO HEALTH-AND-SAFETY PLAN

I HAVE READ THE SITE-SAFETY PLAN FOR THIS SITE AND FULLY UNDERSTAND ITS CONTENTS. I AGREE TO FOLLOW THIS SITE SAFETY PLAN IN ALL RESPECT.

NAME	DATE

WORKER/VISITOR ACKNOWLEDGMENT TO HEALTH-AND-SAFETY PLAN

I HAVE READ THE SITE-SAFETY PLAN FOR THIS SITE AND FULLY UNDERSTAND ITS CONTENTS. I AGREE TO FOLLOW THIS SITE SAFETY PLAN IN ALL RESPECT.

NAME	DATE

EXHIBIT III

MATERIAL SAFETY DATA SHEETS

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 296
Arsenic and Compounds

Issued: 4/90

Section 1. Material Identification

Arsenic Description: Obtained from flue dust of copper and lead smelters as white arsenic (arsenic trioxide). Reduction with charcoal and sublimation in an N_2 current yields pure arsenic. Metallic arsenic is used for hardening copper, lead, and alloys; as a doping agent in germanium and silicon solid-state products, special solders, and medicine; and to make gallium arsenide for dipoles and other electronic devices. Arsenic compounds are used in manufacturing certain types of glass; in textile printing, tanning, taxidermy, pharmaceuticals, insecticides and fungicides, pigment production, and antifouling paints; and to control sludge formation in lubricating oils. Arsenic trioxide is the source for 97% of all arsenic products.

Other Designations: CAS No. 7440-38-2; arsen; arsenic black; As; gray arsenic; metallic arsenic.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(73) for a suppliers list.

R 1
I 4
S 2
K 0

Genium
3 3 2 -

HMIS
H 3
F 2
R 2
PPG*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Arsenic and soluble compounds, as As

OSHA PEL
8-hr TWA: 0.5 mg/m³,* 0.01 mg/m³†

ACGIH TLV, 1989-90
TLV-TWA: 0.2 mg/m³

NIOSH REL, 1987
Ceiling: 0.002 mg/m³

Toxicity Data‡
Man, oral, TD_{Lo}: 76 mg/kg administered intermittently over a 12-year period affects the liver (tumors) and blood (hemorrhage)
Man, oral: 7857 mg/kg administered over 55 years produces gastrointestinal (in the structure or function of the esophagus), blood (hemorrhage), and skin and appendage (dermatitis) changes
Rat, oral, TC_{Lo}: 605 µg/kg administered to a 35-week pregnant rat affects fertility (pre- and post-implantation mortality)

* Organic compounds.
† Inorganic compounds.
‡ See NIOSH, *RTECS* (CG0525000), for additional mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data*

Boiling Point: sublimes at 1134 °F/612 °C
Melting Point: 1497 °F/814 °C
Vapor Pressure: 1 mm at 702 °F/372 °C (sublimes)

Atomic Weight: 74.92
Density: 5.724 at 57 °F/14 °C
Water Solubility: Insoluble†

Appearance and Odor: A brittle, crystalline, silvery to black metalloid. Odorless.

* This data pertains to arsenic only.
† Arsenic is soluble in nitric acid (HNO_3).

Section 4. Fire and Explosion Data

Flash Point: None reported	Autoignition Temperature: None reported	LEL: None reported	UEL: None reported

Extinguishing Media: Use dry chemical, CO_2, water spray, or foam to fight fires.
Unusual Fire or Explosion Hazards: Flammable and slightly explosive in the form of dust when exposed to heat or flame.
Special Fire-fighting Procedures: Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Arsenic is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Arsenic can react vigorously on contact with powerful oxidizers such as bromates, peroxides, chlorates, iodates, lithium, silver nitrate, potassium nitrate, potassium permanganate, and chromium (VI) oxide. This material is also incompatible with halogens, bromine azide, palladium, dirubidium acetylide, zinc, and platinum.
Hazardous Products of Decomposition: Thermal oxidative decomposition of arsenic and its compounds produces irritating or poisonous gases.

Section 6. Health Hazard Data

Carcinogenicity: The IARC, NTP, and OSHA list arsenic as a human carcinogen (Group 1). This evaluation applies to arsenic and arsenic compounds as a whole, and not necessarily to all individual chemicals within the group. Studies report that both the trivalent and pentavalent compounds are strongly implicated as causes of skin, lung, and lymphatic cancers. Experimental studies have shown that arsenic has tumoriger teratogenic effects in laboratory animals.

Summary of Risks: Arsenic compounds are irritants of the skin, mucous membranes, and eyes. The moist mucous membranes are most sensitive to irritation. Prolonged contact results in local hyperemia (blood congestion) and later vesicular or pustular eruption. Epidermal carcinoma is a reported risk of exposure. Peripheral neuropathy (degenerative state of the nervous system) is common after acute or chronic arsenic poisoning. Symptoms include decreased sensation to touch, pinprick, and temperature; loss of vibration sense; and profound muscle weakness and wasting. Other complications of acute and chronic arsenic poisoning are encephalopathy (alterations of brain structure) and toxic delirium.

Medical Conditions Aggravated by Long-Term Exposure: Damage to the liver, nervous, and hematopoietic (responsible for the formation of blood or blood cells in the body) system may be permanent. Pulmonary and lymphatic cancer may also occur.

Target Organs: Liver, kidneys, skin, lungs, lymphatic system.

Primary Entry Routes: Inhalation, ingestion of dust and fumes, via skin absorption.

Acute Effects: Acute industrial intoxication is more likely to arise from inhalation of arsine. However, with corrosive arsenical vapors, conjunctivitis, eyelid edema, and even corneal erosion may result. Inhalation may result in nasal irritation with perforation of the septum, cough, chest pain, hoarseness, pharyngitis, and inflammation of the mouth. If ingested, metallic or garlic taste, intense thirst, nausea, vomiting, abdominal pain, diarrhea, and cardiovascular arrhythmias (heartbeat irregularities) may occur. Symptoms generally occur within 30 minutes, but may be delayed for several hours if ingested with food. Acute poisoning may result in acute hemolysis (breakdown of red blood cells).

Chronic Effects: Chronic symptoms include weight loss, hair loss, nausea, and diarrhea alternating with constipation, palmar and plantar hyperkeratoses (thickening of the corneous layer of skin on palms and soles of feet), and skin eruptions, and peripheral neuritis (inflammation of the nerves). Leukemia, bone marrow depression, or aplastic anemia (dysfunctioning of blood-forming organs) may occur after chronic exposure.

FIRST AID

Eyes: Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.

Skin: *Quickly* remove contaminated clothing. After rinsing affected skin with flooding amounts of water, wash it with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have a *conscious* person drink 1 to 2 glasses of water, then induce repeated vomiting until vomit is clear.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Physician's Note: If emesis is unsuccessful after two doses of Ipecac, consider gastric lavage. Monitor urine arsenic level. Alkalinization of urine may help prevent disposition of red cell breakdown products in renal tubular cells. If acute exposure is significant, maintain high urine output and monitor volume status, preferably with central venous pressure line. Abdominal X-rays should be done routinely for all ingestions. Chelation therapy with BAL, followed by D-penicillamine is recommended, but specific dosing guidelines are not clearly established.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel of spill, evacuate all unnecessary personnel, remove all heat and ignition sources, and provide adequate ventilation. Cleanup personnel should protect against dust inhalation and contact with skin and eyes. Use nonsparking tools. With a clean shovel, scoop material into a clean, dry container and cover. Absorb liquid material with sand or noncombustible inert material and place in disposal containers. Do not release to sewers, drains, or waterways. Follow applicable OSHA regulations (29 CFR 1910.120).

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations*
RCRA Hazardous Waste (40 CFR 261.33): Not listed
Listed as a CERCLA Hazardous Substance† (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.454 kg) [† per Clean Water Act, Sec. 307(a); per Clean Air Act, Sec. 112]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)

OSHA Designations‡
Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

* Designations for arsenic only.
‡ Listed as arsenic organic compounds (as As).

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

Warning: Air-purifying respirators do *not* protect workers in oxygen-deficient atmospheres.

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA PELs, ACGIH TLVs, and NIOSH REL (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[103]

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in closed, properly labeled, containers in a cool, well-ventilated area away from all incompatible materials (Sec. 5) and heat and ignition sources. Protect containers from physical damage.

Engineering Controls: Avoid inhalation or ingestion of dust and fumes, and skin or eye contact. Practice good personal hygiene and housekeeping procedures. Use only with adequate ventilation and appropriate personal protective gear. Institute a respiratory protection program with training, maintenance, inspection, and evaluation. All engineering systems should be of maximum explosion-proof design and electrically grounded and bonded. Provide preplacement and annual physical examination with emphasis on the skin, respiratory system, and blood.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Arsenic, solid
DOT Hazard Class: Poison B
ID No.: UN1558
DOT Label: Poison
DOT Packaging Requirements: 173.366
DOT Packaging Exceptions: 173.364

IMO Shipping Name: Arsenic, metallic
IMO Hazard Class: 6.1
IMO Label: Poison
IMDG Packaging Group: II
ID No.: UN1558

MSDS Collection References: 7, 26, 38, 53, 73, 85, 87, 88, 89, 100, 103, 109, 123, 124, 126, 127, 130, 136, 138

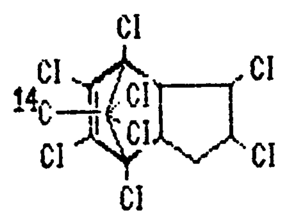
Prepared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: MJ Hardies, MD

MATERIAL SAFETY DATA SHEET

gma-Aldrich Corporation
J01 West Saint Paul Ave, Milwaukee, WI 53233 USA

Version July 1991

	Sigma	Aldrich
For Emergency Contact USA/Canada	800-325-5832	800-231-8327
Outside USA/Canada	314-771-5765	414-273-3850



31,215-8

------------------ IDENTIFICATION ------------------

PRODUCT #: 312150 NAME: CHLORDANE-UL-14C
CAS #: 34253-81-1
MF: C10H6CL8

SYNONYMS

ASPON-CHLORDANE * BELT * CD 68 * CHLOORDAAN (DUTCH) * CHLORDAN * GAMMA-CHLORDAN * CHLORDANE * CHLORDANE (ACGIH,DOT,OSHA) * CHLORINDAN * CHLOR KIL * CHLORODANE * CHLORTOX * CLORDAN (ITALIAN) * CLORDANO * CORODANE * CORTILAN-NEU * DICHLOROCHLORDENE * DOWCHLOR * ENT 9.932 * ENT 25,552-X * HCS 3260 * KILEX LINDANE * KYPCHLOR * LATKA 1068 (CZECH) * M 140 * M 410 * 4,7-METHANO-1H-INDENE, 1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO- * NA 2762 (DOT) * NCI-C00099 * NIRAN * OCTACHLOR * OCTACHLORODIHYDRODICYCLOPENTADIENE * 1,2,4,5,6,7,8,8-OCTAHYDRO-2,3,3A,4,7,7A-HEXAHYDRO-4,7-METHANOINDAN * 1,2,4,5,6,7,8,8-OCTACHLOR-2,3,3A,4,7,7A-HEXAHYDRO-4,7-METHANOINDANE * 1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO-4,7-METHANOINDENE * 1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO-4,7-METHANO-1H-INDENE * 1,2,4,5,6,7,8,8-OCTACHLORO-3A,4,7,7A-HEXAHYDRO-4,7-METHYLENE INDANE * OCTACHLORO-4,7-METHANOHYDROINDANE * OCTACHLORO-4,7-METHANOTETRAHYDROINDANE * 1,2,4,5,6,7,8,8-OCTACHLORO-4,7-METHANO-3A,4,7,7A-TETRAHYDROINDANE * 1,2,4,5,6,7,8,8-OCTACHLOOR-3A,4,7,7A-TETRAHYDRO-4,7-ENDO-METHANO-INDAAN (DUTCH) * 1,2,4,5,6,7,8,8-

OCTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOINDAN * 1,2,4,5,6,7,8,8-OCTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOINDANE * 1,2,4,5,6,7,10,10-OCTACHLORO-4,7,8,9-TETRAHYDRO-4,7-METHYLENEINDANE * 1,2,4,5,6,7,8,8-OCTACHLOR-3A,4,7,7A-TETRAHYDRO-4,7-ENDO-METHANO-INDAN (GERMAN) * OCTA-KLOR * OKTATERR * OMS 1437 * ORTHO-KLOR * 1,2,4,5,6,7,8,8-OTTOCHLORO-3A,4,7,7A-TETRAIDRO-4,7-ENDO-METANO-INDANO (ITALIAN) * RCRA WASTE NUMBER U036 * SD 5532 * SHELL SD-5532 * STARCHLOR * SYNKLOR * UNEXAN-KOEDER * TAT CHLOR 4 * TERMI-DED * TOPICHLOR 20 * TOPICLOR * TOPICLOR 20 * TOXICHLOR * VELSICOL 1068 *

------------------ TOXICITY HAZARDS ------------------

RTECS NO: PB9800000

4,7-METHANOINDAN, 1,2,4,5,6,7,8,8-OCTACHLORO-3A,4,7,7A-TETRAHYDRO-

TOXICITY DATA

ORL-HMN LDLO:29 MG/KG	CMEP** -,1,56
ORL-WMN LDLO:120 UG/KG	CMEP** -,1,56
SKN-HMN LDLO:428 MG/KG	34ZIAG -,648,69
UNR-MAN LDLO:118 MG/KG	85DCAI 2,73,70
ORL-RAT LD50:200 MG/KG	ARZNAD 17,614,67
SKN-RAT LD50:690 MG/KG	JAVMA4 157,1835,70
IPR-RAT LD50:343 MG/KG	TXAPA9 32,443,75
ORL-MUS LD50:145 MG/KG	ARSIM* 20,19,66
IVN-MUS LD50:100 MG/KG	CSLNX* NX#04876
IHL-CAT LC50:100 MG/M3/4H	GTPZAB 8(4),30,64
ORL-RBT LD50:100 MG/KG	PCOC** -,226,66
SKN-RBT LD50:780 MG/KG	85DPAN -,-,71/76
ORL-HAM LD50:1720 MG/KG	EJTXAZ 7,159,74
ORL-CKN LD50:220 MG/KG	PCOC** -,226,66
ORL-QAL LD50:83 MG/KG	PEMNDP 8,146,87
ORL-DCK LD50:1200 MG/KG	DOEAAH 35,25,79
ORL-DOM LD50:50 MG/KG	YKYUA6 32,471,81
ORL-MAM LD50:180 MG/KG	PCOC** -,226,66

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 0.5 MG/M3 (SKIN)	85INA8 5,114,86
IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE	IMEMDT 20,45,79
IARC CANCER REVIEW:ANIMAL LIMITED EVIDENCE	IMSUDL 7,146,87
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE	IMEMDT 20,45,79
IARC CANCER REVIEW:GROUP 3	IMSUDL 7,146,87

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION
FEREAC 54,7740,89
MSHA STANDARD-AIR:TWA 0.5 MG/M3 (SKIN)
DTLVS* 3,44,71
OSHA PEL:8H TWA 0.5 MG/M3 (SKIN)
FEREAC 54,2923,89
OSHA PEL FINAL:8H TWA 0.5 MG/M3 (SKIN)
FEREAC 54,2923,89
ATSDR TOXICOLOGY PROFILE (NTIS** PB/90/168709/AS)
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1990
NCI CARCINOGENESIS BIOASSAY (FEED);CLEAR EVIDENCE:MOUSE
NCITR* NCI-TR-8,77
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:RAT
NCITR* NCI-TR-8,77

TARGET ORGAN DATA

BEHAVIORAL (TREMOR)
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)
BEHAVIORAL (EXCITEMENT)

BEHAVIORAL (ATAXIA)
BEHAVIORAL (COMA)
LUNGS, THORAX OR RESPIRATION (DYSPNAE)
GASTROINTESTINAL (GASTRITIS)
GASTROINTESTINAL (NAUSEA OR VOMITING)
LIVER (FATTY LIVER DEGENERATION)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (ENDOCRINE SYSTEM)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (IMMUNE AND RETICULOENDOTHELIAL SYST
EFFECTS ON NEWBORN (BIOCHEMICAL AND METABOLIC)
EFFECTS ON NEWBORN (BEHAVIORAL)
EFFECTS ON NEWBORN (DELAYED EFFECTS)
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS)
DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

------------------- HEALTH HAZARD DATA -----------------

ACUTE EFFECTS
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
READILY ABSORBED THROUGH SKIN.
EXPOSURE CAN CAUSE:
IRRITABILITY, CONVULSIONS, DEEP DEPRESSION, EFFECTS ARE CUMULATIVE

CHRONIC EFFECTS
CARCINOGEN.
PROLONGED EXPOSURE CAN CAUSE:
DAMAGE TO THE LIVER
DAMAGE TO THE KIDNEYS
CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER
AND GENETIC MUTATION.

FIRST AID
FLUSH SKIN WITH WATER.
IN CASE OF SKIN CONTACT, FLUSH WITH COPIOUS AMOUNTS OF WATER
FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND
SHOES. CALL A PHYSICIAN.
IF INHALED, REMOVE TO FRESH AIR. IF BREATHING BECOMES DIFFICULT,
CALL A PHYSICIAN.
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER
FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING
THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.

-------------------- PHYSICAL DATA --------------------

DATA NOT AVAILABLE

------------ FIRE AND EXPLOSION HAZARD DATA -----------

FLASHPOINT: 132'F BY: CLOSED CUP
56'C BY: CLOSED CUP

------------------- REACTIVITY DATA -------------------

STABILITY
STABLE.
CONDITIONS TO AVOID
HEAT
INCOMPATIBILITIES
OXIDIZING AGENTS
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS
HAZARDOUS POLYMERIZATION
WILL NOT OCCUR.

--------------- SPILL OR LEAK PROCEDURES --------------

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
HANDLE AS A RADIOACTIVE SPILL.

WASTE DISPOSAL METHOD

DISPOSE OF SPILLED MATERIAL AS RADIOACTIVE WASTE.
CONSULT LOCAL, STATE AND FEDERAL REGULATIONS ON THE DISPOSAL OF RADIOACTIVE WASTE.
OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

HIGHLY FLAMMABLE.
TOXIC BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
MAY CAUSE CANCER.
KEEP AWAY FROM SOURCES OF IGNITION. NO SMOKING.
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE).
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.
KEEP CONTAINER TIGHTLY CLOSED IN A COOL WELL VENTILATED PLACE.
RADIOACTIVE MATERIAL.

---------- ADDITIONAL PRECAUTIONS AND COMMENTS ----------

THIS PRODUCT ALSO CONTAINS THE FOLLOWING COMPONENT(S)

Z6637 TOLUENE

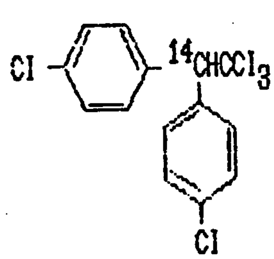
THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ᴮOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL ERMS AND CONDITIONS OF SALE

MATERIAL SAFETY DATA SHEET

Sigma-Aldrich Corporation
01 West Saint Paul Ave. Milwaukee. WI 53233 USA

Version July 1991

	Sigma	Aldrich
For Emergency Contact USA/Canada	800-325-5832	800-231-8327
Outside USA/Canada	314-771-5765	414-273-3850



31,258-4

------------------ IDENTIFICATION ------------------

PRODUCT #: 312584 NAME: 4.4'-DDT-ETHANE-2-14C
CAS #: 960-45-2
MF: C14H9CL5

SYNONYMS
AGRITAN * ANOFEX * ARKOTINE * AZOTOX * BENZENE. 1,1'-(2,2,2-TRICHLOROETHYLIDENE)BIS(4-CHLORO- * ALPHA,ALPHA-BIS(P-CHLOROPHENYL)-BETA,BETA,BETA-TRICHLORETHANE * 1,1-BIS-(P-CHLOROPHENYL)-2,2,2-TRICHLOROETHANE * 2,2-BIS(P-CHLOROPHENYL)-1,1,1-TRICHLOROETHANE * BOSAN SUPRA * BOVIDERMOL * CHLOROPHENOTHAN * CHLOROPHENOTHANE * CHLOROPHENOTOXUM * CITOX * CLOFENOTANE * DDT * P,P'-DDT * DDT (ACGIH, DOT,OSHA) * DEDELO * DEOVAL * DETOX * DETOXAN * DIBOVAN * DICHLORODIPHENYLTRICHLOROETHANE * P,P'-DICHLORODIPHENYLTRICHLOROETHANE * 4,4'-DICHLORODIPHENYLTRICHLOROETHANE * DICHLORODIPHENYLTRICHLOROETHANE (DOT,OSHA) * DICOPHANE * DIDIGAM * DIDIMAC * DIPHENYLTRICHLOROETHANE * DODAT * DYKOL * ENT 1,506 * ESTONATE * GENITOX * GESAFID * GESAPON * GESAREX * GESAROL * GUESAPON * GUESAROL * GYRON * HAVERO-EXTRA * HILDIT * IVORAN * IXODEX * KOPSOL * MICRO DDT 75 * MUTOXIN * NA 2761 (DOT) * NCI-C00464 * NEOCID * OMS 16 * PARACHLOROCIDUM * PEB1 * PENTACHLORIN * PENTECH * PPZEIDAN * R50 * RCRA WASTE NUMBER U061 * RUKSEAM * SANTOBANE * TECH DDT * 1,1,1-TRICHLOOR-2,2-BIS(4-CHLOOR

FENYL)-ETHAAN (DUTCH) * 1,1,1-TRICHLOR-2,2-BIS(4-CHLOR-PHENYL)-AETHAN (GERMAN) * TRICHLOROBIS(4-CHLOROPHENYL)ETHANE * 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)ETHANE * 1,1,1-TRICHLORO-2,2-DI(4-CHLOROPHENYL)-ETHANE * 1,1,1-TRICLORO-2,2-BIS(4-CLORO-FENIL)-ETANO (ITALIAN) * ZEIDANE * ZERDANE *

------------------ TOXICITY HAZARDS ------------------

RTECS DATA SUPPLIED IS FOR A CLOSELY RELATED COMPOUND.

RTECS NO: KJ3325000

ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-

TOXICITY DATA

ORL-INF LDLO:150 MG/KG	BMJOAE 2,845,45
ORL-HMN LDLO:500 MG/KG	MEIEDD 11,446,89
UNR-MAN LDLO:221 MG/KG	85DCAI 2,73,70
ORL-RAT LD50:87 MG/KG	DOEAAH 35,25,79
SKN-RAT LD50:1931 MG/KG	SPEADM 78-1,14,78
IPR-RAT LD50:9100 UG/KG	PESTD5 17,351,76
SCU-RAT LD50:1500 MG/KG	BMJOAE 1,865,45
IVN-RAT LD50:68 MG/KG	ANTBAL 14,316,69
UNR-RAT LD50:300 MG/KG	GISAAA 37(10),27,72
ORL-MUS LD50:135 MG/KG	FEPRA7 12,368,53
IPR-MUS LD50:32 MG/KG	PESTD5 17,351,76
IVN-MUS LD50:68500 UG/KG	ANTBAL 14,316,69
ORL-DOG LD50:150 MG/KG	YKYUA6 32,463,81
ORL-MKY LD50:200 MG/KG	AVPCAQ 12,31,75
ORL-RBT LD50:250 MG/KG	PCOC** -,347,66
SKN-RBT LD50:300 MG/KG	BMJOAE 1,865,45
SCU-RBT LD50:250 MG/KG	BMJOAE 1,865,45
ORL-GPG LD50:150 MG/KG	EJTXAZ 7,159,74
SKN-GPG LD50:1000 MG/KG	BMJOAE 1,865,45
SCU-GPG LD50:900 MG/KG	BMJOAE 1,865,45
ORL-FRG LD50:7600 UG/KG	ENVPAF 20,45,79
SCU-FRG LD50:24100 UG/KG	AIPTAK 74,343,47

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 1 MG/M3	85INA8 5,168,86
IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE	IMEMDT 5,83,74
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE	IMEMDT 5,83,74
IARC CANCER REVIEW:GROUP 2B	IMSUDL 7,186,87

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION
FEREAC 54,22706,89

MSHA STANDARD-AIR:TWA (1 MG/M3) (SKIN)
DTLVS* 3,67,71

OSHA PEL:8H TWA 1 MG/M3 (SKIN)
FEREAC 54,2923,89

OSHA PEL FINAL:8H TWA 1 MG/M3 (SKIN)
FEREAC 54,2923,89

NIOSH REL TO DDT-AIR:10H TWA 0.5 MG/M3
MMWR** 37(S-7),10,88

NOHS 1974: HZD 73750; NIS 1; TNF 160; NOS 2; TNE 160

ATSDR TOXICOLOGY PROFILE (NTIS** PB/90/182171/AS)

EPA GENETOX PROGRAM 1988, POSITIVE: CARCINOGENICITY-MOUSE/RAT; IN VITRO CYTOGENETICS-NONHUMAN

EPA GENETOX PROGRAM 1988, POSITIVE: D MELANOGASTER-PARTIAL SEX CHROM. LOSS

EPA GENETOX PROGRAM 1988, POSITIVE: V79 CELL CULTURE-GENE MUTATION

EPA GENETOX PROGRAM 1988, NEGATIVE: HOST-MEDIATED ASSAY; SPERM MORPHOLOGY-MOUSE

EPA GENETOX PROGRAM 1988, NEGATIVE: D MELANOGASTER SEX-LINKED LETHAL; S CEREVISIAE-HOMOZYGOSIS
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: D MELANOGASTER-WHOLE SEX CHROM. LOSS
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: D MELANOGASTER-NONDISJUNCTION; RODENT DOMINANT LETHAL
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: MAMMALIAN MICRONUCLEUS; E COLI POLA WITHOUT S9
EPA TSCA CHEMICAL INVENTORY, JUNE 1990
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1990
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:MOUSE,RAT NCITR* NCI-TR-131,78
NTP FIFTH ANNUAL REPORT ON CARCINOGENS, 1989 : ANTICIPATED TO BE CARCINOGEN

TARGET ORGAN DATA

BEHAVIORAL (GENERAL ANESTHETIC)
BEHAVIORAL (SOMNOLENCE)
BEHAVIORAL (TREMOR)
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)
BEHAVIORAL (EXCITEMENT)
BEHAVIORAL (HEADACHE)
BEHAVIORAL (ANALGESIA)
CARDIAC (ARRYTHMIAS)
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)
LUNGS, THORAX OR RESPIRATION (TUMORS)
GASTROINTESTINAL (NAUSEA OR VOMITING)
LIVER (TUMORS)
BLOOD (LYMPHOMA INCLUDING HODGKIN'S DISEASE)
SKIN AND APPENDAGES (SWEATING)
PATERNAL EFFECTS (SPERMATOGENESIS)
PATERNAL EFFECTS (TESTES, EPIDIDYMIS, SPERM DUCT)
MATERNAL EFFECTS (OVARIES, FALLOPIAN TUBES)
MATERNAL EFFECTS (UTERUS, CERVIX, VAGINA)
MATERNAL EFFECTS (MENSTRUAL CYLCE CHANGES OR DISORDERS)
MATERNAL EFFECTS (PARTURITION)
EFFECTS ON FERTILITY (FEMALE FERTILITY INDEX)
EFFECTS ON FERTILITY (PRE-IMPLANTATION MORTALITY)
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)
EFFECTS ON FERTILITY (OTHER MEASURES OF FERTILITY)
EFFECTS ON EMBRYO OR FETUS (EXTRA EMBRYONIC STRUCTURES)
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (UROGENITAL SYSTEM)
TUMORIGENIC EFFECTS (TRANSPLACENTAL TUMORIGENESIS)
EFFECTS ON NEWBORN (WEANING OR LACTATION INDEX)
EFFECTS ON NEWBORN (GROWTH STATISTICS)
EFFECTS ON NEWBORN (BEHAVIORAL)
EFFECTS ON NEWBORN (DELAYED EFFECTS)
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)
TUMORIGENIC (NEOPLASTIC BY RTECS CRITERIA)
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

---------------- HEALTH HAZARD DATA ----------------

ACUTE EFFECTS

WARNING:
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.

CAUSES IRRITATION.

CHRONIC EFFECTS

CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER AND GENETIC MUTATION.

FIRST AID

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.

CALL A PHYSICIAN.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

DISCARD CONTAMINATED SHOES.

------------------- PHYSICAL DATA -------------------

MELTING PT: 107 C TO 109 C

------------ FIRE AND EXPLOSION HAZARD DATA -----------

EXTINGUISHING MEDIA

DRY CHEMICAL POWDER.

WATER SPRAY.

ALCOHOL OR POLYMER FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

------------------ REACTIVITY DATA ------------------

INCOMPATIBILITIES

BASES

OXIDIZING AGENTS

IRON AND IRON SALTS

ALUMINUM

ZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE GAS

--------------- SPILL OR LEAK PROCEDURES --------------

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

SELF-CONTAINED BREATHING APPARATUS SHOULD BE WORN.

SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

HANDLE AS A RADIOACTIVE SPILL.

WASTE DISPOSAL METHOD

DISPOSE OF SPILLED MATERIAL AS RADIOACTIVE WASTE.

CONSULT LOCAL, STATE AND FEDERAL REGULATIONS ON THE DISPOSAL OF RADIOACTIVE WASTE.

OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

CHEMICAL SAFETY GOGGLES.

WEAR HEAVY RUBBER GLOVES.

MECHANICAL EXHAUST REQUIRED.

AVOID CONTACT AND INHALATION.

DO NOT ENTER STORAGE AREAS THAT ARE NOT ADEQUATELY VENTILATED.

STORE IN A COOL DRY PLACE.

CAUTION: RADIOACTIVE MATERIAL.

MATERIAL SAFETY DATA SHEET

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01 West Saint Paul Ave. Milwaukee, WI 53233 USA

Version July 1991

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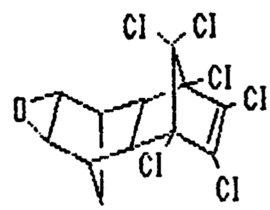


29,121-8

------------------- IDENTIFICATION -------------------

PRODUCT #: 29121-8 NAME: DIELDRIN, TECH., CA. 90%
CAS #: 60-57-1
MF: C12H8CL6O

SYNONYMS
ALVIT * COMPOUND 497 * DIELDREX * DIELDRIN * DIELDRIN (ACGIH,DOT,OSHA) * DIELDRINE (FRENCH) * DIELDRITE * ENT 16,225 * HEOD * HEXACHLOROEPOXYOCTAHYDRO-ENDO,EXO-DIMETHANONAPHTHALENE * 3,4,5,6,9,9-HEXACHLORO-1A,2,2A,3,6,6A,7,7A-OCTAHYDRO-2,7:3,6-DIMETHANONAPHTH(2,3-B)OXIRENE * ILLOXOL * INSECTICIDE NO. 497 * LATKA 497 (CZECH) * NA 2761 (DOT) * NCI-C00124 * OCTALOX * PANORAM D-31 * QUINTOX * RCRA WASTE NUMBER P037 *

------------------- TOXICITY HAZARDS -------------------

RTECS NO: IO1750000
1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6,7-EPOXY-1,4,4A,5,6,7,8,8A- OCTAHYDRO, ENDO,EXO-

TOXICITY DATA

ORL-MAN LDLO:65 MG/KG	34ZIAG -,215,69
UNR-HMN LDLO:28 MG/KG	ATXKA8 22,115,66
ORL-RAT LD50:38300 UG/KG	JAFCAU 3,402,55
IHL-RAT LC50:13 MG/M3/4H	85GMAT -,73,82
SKN-RAT LD50:56 MG/KG	RPZHAW 18,161,67

IPR-RAT LD50:35 MG/KG	CBPCEE 85,437,86
SCU-RAT LD50:49 MG/KG	85GMAT -,73,82
IVN-RAT LD50:9 MG/KG	BJIMAG 21,269,64
ORL-MUS LD50:38 MG/KG	SPEADM 78-1,13,78
IVN-MUS LD50:10500 UG/KG	TXAPA9 23,408,72
ORL-DOG LD50:65 MG/KG	GUCHAZ 6,198,73
ORL-MKY LD50:3 MG/KG	32ZDAL -,79,70
IHL-CAT LC50:80 MG/M3/4H	GTPZAB 8(4),30,64
ORL-RBT LD50:45 MG/KG	PCOC** -,377,66
SKN-RBT LD50:250 MG/KG	SPEADM 78-1,13,78
ORL-PIG LD50:38 MG/KG	EJTXAZ 7,159,74
ORL-GPG LD50:49 MG/KG	PCOC** -,377,66
ORL-HAM LD50:60 MG/KG	TJADAB 9,11,74
ORL-PGN LD50:23700 UG/KG	ASTTA8 (680),157,79
IVN-PGN LD50:1200 MG/KG	32ZDAL -,79,70
ORL-CKN LD50:20 MG/KG	JEENAI 44,1013,51
ORL-QAL LD50:10780 UG/KG	ETOCDK 1,157,82
ORL-DCK LD50:381 MG/KG	TXAPA9 20,57,71
UNR-MAM LD50:25 MG/KG	30ZDA9 -,63,71
ORL-BWD LD50:13300 UG/KG	ASTTA8 (680),157,79

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 0.25 MG/M3 (SKIN) 85INA8 5,196,86
IARC CANCER REVIEW:ANIMAL LIMITED EVIDENCE IMEMDT 5,125,74
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE IMEMDT 5,125,74
IARC CANCER REVIEW:GROUP 3 IMSUDL 7,196,87
MSHA STANDARD-AIR:TWA 0.25 MG/M3 (SKIN) DTLVS* 3,84,71
OSHA PEL:8H TWA 0.25 MG/M3 (SKIN) FEREAC 54,2923,89
OSHA PEL FINAL:8H TWA 0.25 MG/M3 (SKIN) FEREAC 54,2923,89
NIOSH REL TO DIELDRIN-AIR:TWA REDUCE TO LOWEST DETECTABLE LEVEL MMWR** 37(S-7).,3,88
NOHS 1974: HZD M2830; NIS 2; TNF 56; NOS 3; TNE 760
ATSDR TOXICOLOGY PROFILE (NTIS** PB/89/214514/AS)
EPA GENETOX PROGRAM 1988, POSITIVE: V79 CELL CULTURE-GENE MUTATION
EPA GENETOX PROGRAM 1988, NEGATIVE: RODENT DOMINANT LETHAL; HOST-MEDIATED ASSAY
EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST; S CEREVISIAE-HOMOZYGOSIS
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: D MELANOGASTER SEX-LINKED LETHAL
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1990
NCI CARCINOGENESIS BIOASSAY (FEED);CLEAR EVIDENCE:MOUSE NCITR* NCI-TR-21,78
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:RAT NCITR* NCI-TR-22,78
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:RAT NCITR* NCI-TR-21,78

TARGET ORGAN DATA

BEHAVIORAL (ALTERED SLEEP TIME)
BEHAVIORAL (SOMNOLENCE)
BEHAVIORAL (FOOD INTAKE)
BEHAVIORAL (WITHDRAWAL)
BEHAVIORAL (IRRITABILITY)
LUNGS, THORAX OR RESPIRATION (CHRONIC PULMONARY EDEMA OR CONGESTION)
LUNGS, THORAX OR RESPIRATION (TUMORS)
GASTROINTESTINAL (NAUSEA OR VOMITING)
LIVER (FATTY LIVER DEGENERATION)
LIVER (TUMORS)

KIDNEY, URETER, BLADDER (OTHER CHANGES)
SKIN AND APPENDAGES (TUMORS)
PATERNAL EFFECTS (SPERMATOGENESIS)
PATERNAL EFFECTS (PROSTATE, SEMINAL VESICLE, COWPER'S, ACCESSORY GLANDS
PATERNAL EFFECTS (OTHER EFFECTS ON MALE)
EFFECTS ON FERTILITY (PRE-IMPLANTATION MORTALITY)
EFFECTS ON FERTILITY (POST-IMPLANTATION MORTALITY)
EFFECTS ON EMBRYO OR FETUS (FETOTOXICITY)
EFFECTS ON EMBRYO OR FETUS (FETAL DEATH)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CENTRAL NERVOUS SYSTEM)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (EYE, EAR)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (CRANIOFACIAL)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (BODY WALL)
SPECIFIC DEVELOPMENTAL ABNORMALITIES (MUSCULOSKELETAL SYSTEM)
EFFECTS ON NEWBORN (LIVE BIRTH INDEX)
EFFECTS ON NEWBORN (BEHAVIORAL)
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)
TUMORIGENIC (NEOPLASTIC BY RTECS CRITERIA)
TUMORIGENIC (EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

------------------ HEALTH HAZARD DATA -----------------

ACUTE EFFECTS
MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.
MAY CAUSE IRRITATION.

CHRONIC EFFECTS
CARCINOGEN.
MAY ALTER GENETIC MATERIAL.
OVEREXPOSURE MAY CAUSE REPRODUCTIVE DISORDER(S) BASED ON TESTS WITH LABORATORY ANIMALS.
TARGET ORGAN(S):
CENTRAL NERVOUS SYSTEM
LIVER
BLOOD

FIRST AID
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

ADDITIONAL INFORMATION
OVEREXPOSURE CAN CAUSE: MALAISE, HEADACHE, NAUSEA, VOMITING, DIZZINESS, TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY FAILURE.

-------------------- PHYSICAL DATA --------------------

MELTING PT: 143 C TO 144 C
VAPOR DENSITY: 13.2

APPEARANCE AND ODOR
ORANGE-TAN POWDER

----------- FIRE AND EXPLOSION HAZARD DATA -----------

XTINGUISHING MEDIA
WATER SPRAY.

CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

------------------- REACTIVITY DATA -------------------

INCOMPATIBILITIES

STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS

--------------- SPILL OR LEAK PROCEDURES ---------------

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

EVACUATE AREA.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL METHOD

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.
OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

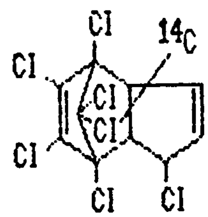
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE DUST.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
READILY ABSORBED THROUGH SKIN.
WASH THOROUGHLY AFTER HANDLING.
HIGHLY TOXIC.
CARCINOGEN.
MUTAGEN.
REPRODUCTIVE HAZARD.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

MATERIAL SAFETY DATA SHEET

gma-Aldrich Corporation
.001 West Saint Paul Ave, Milwaukee, WI 53233 USA

Version July 1991

	Sigma	Aldrich
For Emergency Contact USA/Canada	800-325-5832	800-231-8327
Outside USA/Canada	314-771-5765	414-273-3850



31,314-9

------------------- IDENTIFICATION -------------------

PRODUCT #: 313149 NAME: HEPTACHLOR-14C

CAS #: 15189-24-9

SYNONYMS

AGROCERES * 3-CHLOROCHLORDENE * DICYCLOPENTADIENE, 3,4,5,6,7,8,8A-HEPTACHLORO- * DRINOX * DRINOX H-34 * E 3314 * ENT 15,152 * EPTACLORO (ITALIAN) * 1,4,5,6,7,8,8-EPTACLORO-3A,4,7,7A-TETRAIDRO-4,7-ENDO-METANO-INDENE (ITALIAN) * GPKH * H * H-34 * H-60 * HEPTA * HEPTACHLOOR (DUTCH) * 1,4,5,6,7,8,8-HEPTACHLOOR-3A,4,7,7A-TETRAHYDRO-4,7-ENDO-METHANO-INDEEN (DUTCH) * HEPTACHLOR * HEPTACHLOR (ACGIH,OSHA) * HEPTACHLORANE * HEPTACHLORE (FRENCH) * 3,4,5,6,7,8,8-HEPTACHLORODICYCLOPENTADIENE * 3,4,5,6,7,8,8A-HEPTACHLORODICYCLOPENTADIENE * 1,4,5,6,7,8,8-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-ENDOMETHANOINDENE * 1,4,5,6,7,8,8A-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOINDANE * 1,4,5,6,7,8,8-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOINDENE * 1(3A),4,5,6,7,8,8-HEPTACHLORO-3A(1),4,7,7A-TETRAHYDRO-4,7-METHANOINDENE * 1,4,5,6,7,8,8-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOL-1H-INDENE * 1,4,5,6,7,8,8-HEPTACHLORO-3A,4,7,7,7A-TETRAHYDRO-4,7-METHYLENE INDENE * 1,4,5,6,7,10,10-HEPTACHLORO-4,7,8,9-TETRAHYDRO-4,7-METHYLENEINDENE * 1,4,5,6,7,10,10-HEPTACHLORO-4,7,8,9-TETRAHYDRO-4,7-ENDOMETHYLENEINDENE * 1,4,5,6,7,8,8-HEPTACHLOR-3A,4,7,7,7A-TETRAHYDRO-4,7-ENDO-METHANO-INDEN (GERMAN) * HEPTAGRAN *

HEPTAMUL * HEPTOX * LATKA 104 (CZECH) * NCI-C00180 * RCRA WASTE NUMBER P059 * RHODIACHLOR * VELSICOL 104 * VELSICOL HEPTACHLOR *

------------------ TOXICITY HAZARDS ------------------

ECS NO: PC0700000

4,7-METHANOINDENE, 1,4,5,6,7,8,8-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-

TOXICITY DATA

ORL-RAT LD50:40 MG/KG	PHJOAV 185,361,60
SKN-RAT LD50:119 MG/KG	SPEADM 78-1,12,78
IPR-RAT LD50:27 MG/KG	FCTXAV 11,63,73
ORL-MUS LD50:68 MG/KG	SPEADM 78-1,12,78
IPR-MUS LD50:130 MG/KG	SOGEBZ 2,80,66
ORL-GPG LD50:116 MG/KG	PCOC** -,576,66
ORL-HAM LD50:100 MG/KG	EJTXAZ 7,159,74
UNR-MAM LD50:60 MG/KG	30ZDA9 -,59,71

REVIEWS, STANDARDS, AND REGULATIONS

ACGIH TLV-TWA 0.5 MG/M3 (SKIN)	85INA8 5,296,86
IARC CANCER REVIEW:ANIMAL SUFFICIENT EVIDENCE	IMEMDT 20,129,79
IARC CANCER REVIEW:ANIMAL LIMITED EVIDENCE	IMSUDL 7,146,87
IARC CANCER REVIEW:ANIMAL INADEQUATE EVIDENCE	IMEMDT 5,173,74
IARC CANCER REVIEW:HUMAN INADEQUATE EVIDENCE	IMEMDT 20,129,79
IARC CANCER REVIEW:GROUP 3	IMSUDL 7,146,87

EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION
 FEREAC 54,7740,89
MSHA STANDARD-AIR:TWA 0.5 MG/M3 (SKIN)
 DTLVS* 3,123,71
OSHA PEL:8H TWA 0.5 MG/M3 (SKIN)
 FEREAC 54,2923,89
OSHA PEL FINAL:8H TWA 0.5 MG/M3 (SKIN)
 FEREAC 54,2923,89
NOHS 1974: HZD 35960; NIS 2; TNF 346; NOS 8; TNE 907
NOES 1983: HZD 35960000; TNF 2; NIS 120; NOS 2; TNE 1034
ATSDR TOXICOLOGY PROFILE (NTIS** PB/89/194492/AS)
EPA GENETOX PROGRAM 1988, POSITIVE/LIMITED: CARCINOGENICITY-MOUSE/RAT
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: HISTIDINE REVERSION-AMES TEST
EPA GENETOX PROGRAM 1988, INCONCLUSIVE: D MELANOGASTER SEX-LINKED LETHAL
ON EPA IRIS DATABASE
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, DECEMBER 1990
NCI CARCINOGENESIS BIOASSAY (FEED);CLEAR EVIDENCE:MOUSE
 NCITR* NCI-TR-9,77
NCI CARCINOGENESIS BIOASSAY (FEED);NO EVIDENCE:RAT
 NCITR* NCI-TR-9,77

TARGET ORGAN DATA

BEHAVIORAL (TREMOR)
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)
BEHAVIORAL (EXCITEMENT)
BEHAVIORAL (CHANGE IN MOTOR ACTIVITY)
BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)
BEHAVIORAL (AGGRESSION)
LIVER (TUMORS)
TUMORIGENIC (CARCINOGENIC BY RTECS CRITERIA)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

------------------ HEALTH HAZARD DATA ------------------

CUTE EFFECTS

MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN.

EXPOSURE CAN CAUSE:
TREMORS,CONVULSIONS,KIDNEY DAMAGE,RESPIRATORY COLLAPSE AND DEATH.

RONIC EFFECTS

CARCINOGEN.
REPEATED EXPOSURE CAN CAUSE:
DAMAGE TO THE LIVER
CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER
AND GENETIC MUTATION.
TARGET ORGAN(S):
CENTRAL NERVOUS SYSTEM
LIVER

FIRST AID

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
IN CASE OF SKIN CONTACT, FLUSH WITH COPIOUS AMOUNTS OF WATER
FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND
SHOES. CALL A PHYSICIAN.
IF INHALED, REMOVE TO FRESH AIR. IF BREATHING BECOMES DIFFICULT,
CALL A PHYSICIAN.
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER
FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING
THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.

-------------------- PHYSICAL DATA --------------------

MELTING PT: 95-96'C
SPECIFIC GRAVITY: 1.57
SOLUBILITY: ETHANOL-SOLUBLE WATER-INSOLUBLE

------------ FIRE AND EXPLOSION HAZARD DATA -----------

EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.

ECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

------------------- REACTIVITY DATA --------------------

STABILITY

STABLE.

INCOMPATIBILITIES

ALKALI METALS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
HYDROGEN CHLORIDE GAS

HAZARDOUS POLYMERIZATION

WILL NOT OCCUR.

--------------- SPILL OR LEAK PROCEDURES --------------

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

HANDLE AS A RADIOACTIVE SPILL.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

ASTE DISPOSAL METHOD

DISPOSE OF SPILLED MATERIAL AS RADIOACTIVE WASTE.
CONSULT LOCAL, STATE AND FEDERAL REGULATIONS ON THE DISPOSAL OF

RADIOACTIVE WASTE.
OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.

--- PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ---

USE ONLY IN A CHEMICAL FUME HOOD.
SELF-CONTAINED BREATHING APPARATUS.
RUBBER GLOVES.
CHEMICAL SAFETY GOGGLES.
DANGER:
HIGHLY TOXIC.
CARCINOGEN.
AVOID ALL CONTACT.
CAUTION: RADIOACTIVE MATERIAL.

--------- ADDITIONAL PRECAUTIONS AND COMMENTS ---------

THIS PRODUCT ALSO CONTAINS THE FOLLOWING COMPONENT(S)
Z6637 TOLUENE

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE

Material Safety Data Sheets Collection:

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Sheet No. 713
Lead (Inorganic)

Issued: 8/90

32

Section 1. Material Identification

R	0	Genium
I	4	
S	-	
K	0	

Genium diamond: 1 (top), 3 (left), 0 (right), - (bottom)

HMIS
H 3
F 1
R 0
PPG*
* Sec. 8

Lead (Inorganic) (Pb) Description: Exists widely throughout the world in a number of ores. Its main commercial source is galena (lead sulphide). Lead mineral is separated from crude ores by blast-furnace smelting, drossing, or electrolytic refining. Lead is used mostly in manufacturing storage batteries. Other uses are in manufacturing tetraethyllead and both organic and inorganic lead compounds in ceramics, plastics, and electronic devices; in producing ammunition, solder, cable covering, sheet lead, and other metal products (brass, pipes, caulking); in metallurgy; in weights and as ballast; as a chemical intermediate for lead alkyls and pigments; as a constuction material for the tank linings, piping, and equipment used to handle the corrosive gases and liquids used in sulfuric acid manufacturing, petroleum refining, halogenation, sulfonation, extraction, and condensation; and for x-ray and atomic radiation protection.
Other Designations: CAS No. 7439-92-1, lead oxide; lead salts, inorganic; metallic lead; plumbum.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(73) for a suppliers list.

Cautions: *Inorganic lead is a potent systemic poison.* Organic lead (for example, tetraethyl lead) has severe, but different, health effects. Occupational lead poisoning is due to inhalation of dust and fumes. Major affected organ systems are the nervous, blood, and reproductive systems, and kidneys. Health impairment or disease may result from a severe acute short- or long-term exposure.

Section 2. Ingredients and Occupational Exposure Limits

Lead (inorganic) fumes and dusts, as Pb, ca 100%

1989 OSHA PELs (Lead, inorganic compounds)
8-hr TWA: 50 $\mu g/m^3$
Action Level TWA*: 30 $\mu g/m^3$

29 CFR 1910.1025 Lead Standard
Blood Lead Level: 40 μg/100 g

1989-90 ACGIH TLV (Lead, inorganic, fumes and dusts)
TLV-TWA: 150 $\mu g/m^3$

1988 NIOSH REL
10-hr TWA: <100 $\mu g/m^3$

1985-86 Toxicity Data†
Human, inhalation, TC_{Lo}: 10 $\mu g/m^3$ affects gastrointestinal tract and liver
Human, oral, TD_{Lo}: 450 mg/kg ingested over 6 yr affects peripheral and central nervous systems
Rat, oral, TD_{Lo}: 790 mg/kg affects multigeneration reproduction

* Action level applies to employee exposure without regard to respirator use.
† See NIOSH, *RTECS* (OF7525000), for additional mutative, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 3164 °F (1740 °C)
Melting Point: 621.3 °F (327.4 °C)
Vapor Pressure: 1.77 mm Hg at 1832 °F (1000 °C)
Viscosity: 3.2 cp at 621.3 °F (327.4 °C)
Molecular Weight: 207.20
Specific Gravity (20 °C/4 °C): 11.34
Water Solubility: Relatively insoluble in hot or cold water*
Appearance and Odor: Bluish-white, silvery, gray, very soft metal.

* Lead dissolves more easily at a low pH.

Section 4. Fire and Explosion Data

Flash Point: None reported	Autoignition Temperature: None reported	LEL: None reported	UEL: None reported

Extinguishing Media: Use dry chemical, carbon dioxide, water spray, or foam to extinguish fire.
Unusual Fire or Explosion Hazards: Flammable and moderately explosive in the form of dust when exposed to heat or flame.
Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective equipment. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Lead is stable at room temperature in closed containers under normal storage and handling conditions. It tarnishes on exposure to air. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Mixtures of hydrogen peroxide + trioxane explode on contact with lead. Lead is incompatible with sodium azide, zirconium, disodium acetylide, and oxidants. A violent reaction on ignition may occur with concentrated hydrogen peroxide, chlorine trifluoride, sodium acetylide (with powdered lead), ammonium nitrate (below 200 °C with powdered lead). Lead is attacked by pure water and weak organic acids in the presence of oxygen. Lead is resistant to tap water, hydrofluoric acid, brine, and solvents.
Conditions to Avoid: Rubber gloves containing lead may ignite in nitric acid.
Hazardous Products of Decomposition: Thermal oxidative decomposition of lead can produce highly toxic fumes of lead.

Section 6. Health Hazard Data

Carcinogenicity: Although the NTP and OSHA do not list lead as a carcinogen, the IARC lists it as probably carcinogenic to humans, but having (usually) no human evidence. However, the literature reports instances of lead-induced neoplasms, both benign and malignant, of the kidney and other organs in laboratory rodents. Excessive exposure to lead has resulted in neurologic disorders in infants. Experimental studies show lead has reproductive and teratogenic effects in laboratory animals. Human male and female reproductive effects are also documented.
Summary of Risks: Lead is a potent, systemic poison that affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal (GI) system . The most important way lead enters the body is through inhalation, but it can also be ingested when lead dust or unwashed hands contaminate food, drink, or cigarettes. Much of ingested lead passes through feces without absorption into the body. Adults may absorb only 5 to 15% of ingested lead; children may absorb a much larger fraction. Once in the body, lead enters the bloodstream and circulates to various organs. Lead concentrates and remains in bone for many years. The amount of lead the body stores increases as exposure continues, with possibly cumulative effects. Depending on the dose entering the body, lead can be deadly within several days or affect health after many years. Very high doses can cause brain damage (encephalopathy).
Medical Conditions Aggravated by Exposure: Lead may aggravate nervous system disorders (e.g., epilepsy, neuropathies), kidney diseases, high blood pressure (hypertension), infertility, and anemia. Lead-induced anemia and its effect on blood presssure can aggravate cardiovascular disease.

Continue on next page

Section 6. Health Hazard Data, *continued*

Target Organs: Blood, central and peripheral nervous systems, kidneys, and gastrointestinal (GI) tract.
Primary Entry Routes: Inhalation, ingestion.
Acute Effects: An acute, short-term dose of lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are rare. Reversible kidney damage can occur from acute exposure, as well as anemia.
Chronic Effects: Symptoms of chronic long-term overexposure include appetite loss, nausea, metallic taste in the mouth, lead line on gingival (gum) tissue, constipation, anxiety, anemia, pallor of the face and the eye grounds, excessive tiredness, weakness, insomnia, headache, nervous irritability, fine tremors, numbness, muscle and joint pain, and colic accompanied by severe abdominal pain. Paralysis of wrist and, less often, ankle extensor muscles may occur after years of increased lead absorption. Kidney disease may also result from chronic overexposure, but few, if any, symptoms appear until severe kidney damage has occurred. Reproductive damage is characterized by decreased sex drive, impotence, and sterility in men; and decreased fertility, abnormal menstrual cycles, and miscarriages in women. Unborn children may suffer neurologic damage or developmental problems due to excessive lead exposure in pregnant women. Lead poisoning's severest result is encephalopathy manifested by severe headache, convulsions, coma, delirium, and possibly death.
FIRST AID
Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.
Skin: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Consult a physician if any health complaints develop.
Inhalation: Remove exposed person to fresh air and support breathing as needed. Consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If large amounts of lead were ingested, induce vomiting with Ipecac syrup. Consult a physician immediately.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Physician's Note: For diagnosis, obtain blood pressure, blood lead level (PbB), zinc protoporphyrin (ZPP), complete blood count for microcytic anemia and basophilic stippling, urinalysis, and blood urea nitrogen (BUN) of creatinine. Examine peripheral motor neuropathy, pallor, and gingival lead line. Use Ca-EDTA to treat poison, but *never* chelate prophylactically. Consult an occupational physician or toxicologist.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel and evacuate all unnecessary personnel immediately. Cleanup personnel should protect against inhalation of dusts or fume and contact with skin or eyes. Avoid creating dusty conditions. Water sprays may be used in large quantities to prevent the formation of dust. Cleanup methods such as vacuuming (with an appropriate filter) or wet mopping minimizes dust dispersion. Scoop the spilled material into closed containers for disposal or reclamation. Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33, Appendix II—EP Toxicity Test Procedures)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.454 kg) [* per Clean Water Act, Sec. 307(a)]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact. Protective clothing made of man-made fibers and lacking turn-ups, pleats, or pockets retain less dust from lead.
Ventilation: Provide general and local ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[103]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially washing hands before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in tightly closed containers in a cool, dry, well-ventilated area away from all incompatible materials, direct sunlight, and heat and ignition sources.
Engineering Controls: Educate worker about lead's hazards. Follow and inform employees of the lead standard (29 CFR 1910.1025). Avoid inhalation of lead dust and fumes and ingestion of lead. Use only with appropriate personal protective gear and adequate ventilation. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Avoid creating dusty conditions. Segregate and launder contaminated clothing. Take precautions to protect laundry personnel. Practice good personal hygiene and housekeeping procedures. For a variety of reasons, the lead concentration in workroom air may not correlate with the blood lead levels in individuals.
Other Precautions: Provide preplacement and periodic medical examinations which emphasize blood, nervous system, gastrointestinal tract, and kidneys, including a complete blood count and urinalysis. Receive a complete history including previous surgeries and hospitalization, allergies, smoking history, alcohol consumption, proprietary drug intake, and occupational and nonoccupational lead exposure. Maintain records for medical surveillance, airborne exposure monitoring, employee complaints, and physician's written opinions for at least 40 years or duration of employment plus 20 years. Measurement of blood lead level (PbB) and zinc protoporphyrin (ZPP) are useful indicators of your body's lead absorption level. Maintain worker PbBs at or below 40 μg/100 g of whole blood. To minimize adverse reproductive health effects to parents and developing fetus, maintain the PbBs of workers intending to have children below 30 μg/100 g. Elevated PbBs increase your risk of disease, and the longer you have elevated PbBs, the greater your chance of substantial permanent damage.

Transportation Data (49 CFR 172.102)
IMO Shipping Name: Lead compounds, soluble, n.o.s.
IMO Hazard Class: 6.1
ID No.: UN2291
IMO Label: St. Andrews Cross (X, Stow away from foodstuffs)
IMDG Packaging Group: III

MSDS Collection References: 26, 38, 73, 84, 85, 88, 89, 90, 100, 101, 103, 109, 124, 126, 132, 133, 134, 136, 138, 139, 142, 143
Prepared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: MJ Upfal, MD, MPH; Edited by: JR Stuart, MS

EXHIBIT IV

LOCKOUT/TAGOUT PROCEDURE

1. OBJECTIVE

Lockout is the preferred OHM Remediation Services Corp. (OHM) method of isolating machines or equipment from energy sources. This procedure establishes the minimum requirements for the lockout or tagout of equipment. This procedure shall be used to ensure that the machine or equipment being worked on is isolated from all potential hazardous energy sources, and locked out or tagged out before an employee performs any servicing or maintenance activity where that unexpected energization, start-up or release of energy could cause an injury. Energy sources can be electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

2. PURPOSE

This procedure establishes the minimum safety requirements to ensure the proper deactivation of movable, electrically energized, pressurized equipment and systems, and systems containing hazardous materials prior to repairing, cleaning, oiling, adjusting, or similar work. This procedure complies with the requirements in 29 CFR 1910.147.

3. REQUIREMENTS

This procedure applies to all equipment that receives energy from electrical power, hydraulic fluid under pressure, compressed air, steam, energy stored in springs, potential energy from suspended parts, or any other source that may cause unexpected movement when it is necessary to perform work on that system. It also applies to similar functions performed on systems containing hazardous materials.

4. DEFINITIONS

4.1 Lockout - The placement of a lockout device on an energy isolating device, in accordance with this procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed. The lockout device can be key operated or a combination device.

4.2 Tagout - The placement of a tagout device on an energy isolating device, in accordance with this procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed by the authorized person who originally placed the tagout device in position.

4.3 Authorized employee. A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment.

5. PROGRAM ELEMENTS

Prior to initiating any repairs, modifications and/or adjustments to operating equipment, these steps will be followed.

5.1 The immediate supervisor with jurisdiction over the equipment and all affected employees will be notified that the energy sources are to be deactivated.

5.2 All sources of power that must be locked out, blocked or released will be identified by the immediate Supervisor and the employee who will work on the equipment.

5.3 In order to ensure that the equipment cannot be re-energized while maintenance activities are performed, the employee will lockout / blank out all potential energy sources. (The employees will be assigned padlocks with their names or identification numbers affixed to the locks. The locks will be individually keyed to prevent another employee from removing the lock inadvertently.) If more than one employee is assigned to work on the equipment, a multi-lockout hasp will be used so that all employees working on the equipment can apply their locks and ensure their safety.

5.4 A tagout device will be affixed to all components or systems de-energized to indicate that lockout has been performed.

Prior to performing any work activities, the employee will operate the start <u>and stop controls</u> on the equipment to ensure that the equipment has been properly deactivated. After the test, the equipment must be in neutral or off.

5.6 After the servicing and/or maintenance is complete and the equipment is ready for normal operations, check the area around the machine or equipment. After all tools have been removed from the machine or equipment, guards have been reinstalled, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

6. SPECIAL CONDITIONS

During certain operations it may be necessary to energize the equipment for a short period of time. Employees in the immediate area will be notified and directed to stay clear of the equipment. If the operation is to be deactivated again, the employee should repeat steps 5.3 to 5.6 of this procedure before work resumes.

In some instances work will carry over to another shift. The maintenance supervisor shall affix a department lock to the equipment to ensure that it is not energized during the transition. During subsequent slight operations, employees will ensure that steps 5.2 to 5.6 are complete before work resumes on the equipment.

If the work is completed and a lock remains on the equipment, it shall not be removed until the employee responsible for the lock is found or the supervisor of the employee investigates and ascertains that the equipment is safe to operate. Unauthorized removal of a lock will subject the violator to disciplinary action up to dismissal.

7. TRAINING

Initial and annual training will be given to all employees to ensure that the purpose and function of this energy and control program are understood.

8. PERIODIC INSPECTION

Corporate health and safety will conduct an annual audit of the energy control program to ensure that the requirements of their procedures are being followed. A record of annual audits will be kept to comply with the certification requirement of periodic inspections.

EXHIBIT V

SAFE LIFTING PROCEDURE

1. OBJECTIVE

All OHM Remediation Services Corp. (OHM) employees will use the proper lifting techniques and will utilize mechanical means when an objects' weight or bulk cannot be safely lifted by manual means.

2. PURPOSE

This procedure provides the proper lifting technique to be used by OHM employees. By utilizing proper technique, OHM employees can avoid debilitating lower back injuries.

3. REQUIREMENTS

3.1 Use mechanical material handling equipment whenever practical; however, mechanical lifting equipment shall be used only by qualified personnel.

3.2 If the material must be lifted manually, the following procedures apply:

3.2.1 Make certain that the load lifted can be safely handled. Consider the size, weight, and shape of the load. If necessary, get help.

3.2.2 Warm up for the lift by bending, stretching, and turning.

3.2.3 Do not attempt to lift more than 60 pounds.

3.2.4 Ensure proper lifting technique as follows.

- Place feet about shoulder width apart.
- Place one foot alongside the object being lifted and the other foot in front of the object.
- Bend at the knees to grasp the load.
- Maintain slight arch in the back when positioning over load.
- Draw the load close to the body, keeping the arms and elbows tucked into the side of the body.

- Take a firm hold on the load with the palms of the hands, not just the fingers.
- Maintain same slight arch in the back.
- Lift gradually, using your leg muscles. Make sure you draw the load close to your body.
- Do not twist the body when lifting. If you have to change direction, turn with your feet, not your trunk.
- Carry the object close to the body and watch where you are going. Do not carry objects in a manner that obstructs your vision.
- Avoid throwing or dropping objects. When lowering, maintain a firm grip. Watch out for pinching of the fingers. Use your leg muscles to lower the object by bending at the knees and keeping your back straight.

EXHIBIT VI

HIGH-PRESSURE WASHER

1. OBJECTIVE

OHM Remediation Services Corp. (OHM) personnel who have been trained in the proper set-up, use, and care of high pressure washers will be authorized to operate this equipment.

2. PURPOSE

This procedure describes requirements for the safe operation of the high-pressure washer.

3. PERSONAL PROTECTIVE EQUIPMENT

The following equipment will be worn by operators and assistants:

- Safety shoes or boots
- Metal foot and shin guards
- Eye protection (goggles and face shield)
- Hard hat
- Heavy duty PVC rain suit or equivalent
- Heavy chemical resistant gloves

4. OPERATION PROCEDURE

- Only trained, authorized personnel will operate the high-pressure washer.
- The lance must always be pointed at the work area.
- The operator must maintain good footing.
- The operator must have an assistant to aid in moving the hose to different areas and backing up the operator. The assistant must remain in back of the operator.

- Non-operators must remain a safe distance from the operator. The distance must be a minimum of 25 feet.

- The operating pressure should never exceed that which is necessary to complete the job.

- No unauthorized attachment may be made to the unit. (The trigger should never be tied down.)

- The operator should be changed at frequent intervals to avoid fatigue (at least hourly).

- Equipment should be cleaned often to avoid oil or dirt build-up, especially around the trigger and guard area.

- An assistant should always be standing by at the pressure generator to shut down the equipment and monitor the pressure.

- All users must be trained in emergency shut down procedures and general equipment maintenance.

- All lances must be made of seamless <u>stainless steel</u>. Do not use carbon steel which can corrode and result in weakening of the lance.

- <u>DO NOT MODIFY THE LANCE</u>. The lance barrel, from trigger block to the tip, should not be less than <u>48 inches</u> as recommended by manufacturers of hydroblasting equipment.

- Always increase pressure slowly to inspect for leaks. All leaks or malfunctioning equipment must be repaired immediately or the unit taken out-of-service. Never exceed the operating pressure necessary to do the job.

- Attach a cable which connects the water supply hose to the laser wand to prevent whipping should they accidentally disconnect.

- A serious risk of infection and further complications is possible from a hydroblasting laceration. If an injection injury is suspected, the treating physician should be informed so he/she can request a surgeon who specializes in injection injuries. The specialist may have to perform surgery on the affected body part in order to remove the material (oil, particles) that was injected directly through the skin.

EXHIBIT VII

EXCAVATION

1. OBJECTIVE

OHM Remediation Services Corp. (OHM) will control the hazards posed by open excavation through strict compliance with this procedure and the provisions of the excavation permit.

2. SCOPE, APPLICATION AND PURPOSE

This procedure outlines requirements for all open excavations made in the earth's surface. Excavations are defined to include trenches. This policy is intended to protect personnel from the hazards of collapse.

3. REGULATORY REQUIREMENTS

This procedure will follow the guidelines of 29 CFR 1926, Subpart P - Excavations. In the case of United States Army Corp of Engineers projects, the requirements of EM 385-1-1, Section 23 will be observed. In the event of a conflict between these referenced standards, the more stringent will prevail.

4. GENERAL REQUIREMENTS

Safety operations while working in and around excavations involve many factors. Factors to be evaluated and discussed before starting work at daily safety meetings include:

4.1 Surface Encumbrances

All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary to safeguard employees.

4.2 Underground Installations/Utility Locations

The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

4.2.1 Utility companies or the state utility protection service shall be contacted at least two (2) working days prior to excavation activities to be advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

4.2.2 OHM personnel and sub-contractors should be careful to protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations.

4.2.3 If the markings of utility locations are destroyed or removed before excavation commences or is completed, the OHM competent person must notify the utility company or utility protection service to inform them that the markings have been destroyed. Normally, it will take two (2) working days of the notice for the utility protection service to remark the locations.

4.2.4 OHM equipment operators shall maintain a reasonable clearance between any underground utility and the cutting edge or point of powered equipment.

4.2.5 When excavating with powered equipment within 18 inches of the markings of underground facilities, personnel should conduct the excavation in a careful and prudent manner, excavating by hand to determine the precise location of the facility/utility and to prevent damage.

4.2.6 While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

4.3 ACCESS AND EGRESS

4.3.1 Structural Ramps

Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

Structural members used for ramps and runways shall be of uniform thickness.

Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

4.3.2 Means of Egress from Trench Excavations

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

4.4 EXPOSURE TO VEHICULAR TRAFFIC

Employees exposed to public vehicular traffic shall be provided with and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

4.5 EXPOSURE TO FALLING LOADS

No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with 29 CFR 1926.601(b)(6), to provide adequate protection for the operator from falling objects during loading and unloading operations.

4.6 WARNING SYSTEM FOR MOBILE EQUIPMENT

When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals or stop logs. If possible, the grade should be away from the excavation.

4.7 HAZARDOUS ATMOSPHERES

4.7.1 Testing and Controls

In addition to the requirements set forth, 29 CFR 1926.50 - 1926.107; to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are suspected, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet in depth.

Adequate precautions shall be taken, to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation as needed.

Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 10 percent of the lower explosive limit (LEL) of the gas or vapor. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

4.7.2 Emergency Rescue Equipment

Emergency rescue equipment, such as self contained breathing apparatus (SCBA), a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

Employees entering bell-bottom pier holes or other similar deep and confined excavations, shall wear a harness with a life-line securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

4.8 PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

If excavation work interrupts the natural drainage of surface water (such as streams); diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to run-off from heavy rains will require an inspection by a competent person.

4.9 STABILITY OF ADJACENT STRUCTURES

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

4.9.1 A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

4.9.2 The excavation is in stable rock; or

4.9.3 A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

4.9.4 A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

4.9.5 Sidewalks, pavements, and other structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

4.10 PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the excavation face to stop and contain falling material; or other means that provide equivalent protection.

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

4.11 INSPECTIONS

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are required when employee exposure can be reasonably anticipated. An Excavation/Trenching Permit must be completed by the competent person to document the inspections.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

4.12 FALL PROTECTION

Where employees or equipment are required or permitted to cross over excavations; walkways, or bridges with standard guardrails shall be provided.

Adequate barrier for physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc. shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be covered or backfilled.

5. SOIL CLASSIFICATION

OSHA Soil Classification (Appendix A to Subpart P)

5.1 Type A means:

Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

5.1.1 The soil is fissured; or

5.1.2 The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

5.1.3 The soil has been previously disturbed; or

5.1.4 The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

5.1.5 The material is subjected to other factors that would require it to be classified as a less stable material.

5.2 Type B means:

5.2.1 Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

5.2.2 Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

5.2.3 Previously disturbed soils except those which would otherwise be classed by Type C soil.

5.2.4 Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration; or

5.2.5 Dry rock that is not stable; or

5.2.6 Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1H), but only if the material would otherwise be classified as Type B.

5.3 Type C means:

5.3.1 Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or iess; or

5.3.2 Granular soils including gravel, sand, and loamy sand; or

5.3.3 Submerged soil or soil from which water is freely seeping; or

5.3.4 Submerged rock that is not stable; or

5.3.5 Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

6. TIMBER SHORING, ALUMINUM HYDRAULIC AND ALTERNATIVES TO SHORING

Refer to 29 CFR 1926 Subpart P (Appendices C, D, and E) for details on shoring, shields, and trench boxes.

7. SELECTION OF PROTECTIVE SYSTEMS

Refer to 29 CFR 1926 Subpart P (Appendix F) for the decision logic in selecting protective systems.

8. PERMITS

An Excavation/Trenching Permit must be completed by the competent person each day that an excavation is open and personnel may be required to enter the excavation. The excavation permit follows this procedure.

OHM Corporation

EXCAVATION/TRENCHING PERMIT

PERMIT NO.____

Good on This Date Only:______________________ From:____________ AM___ PM___
Project Name:______________________ Project Number:____________________
Project Location:____
Name of Competent Person:______________________________ – A competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The competent person shall also be capable of classifying soil types.

Description of Job or Special Procedures:____

____

EMPLOYEE TRAINING AND PRE-EXCAVATION BRIEFING

1. Safe Excavation and Rescue Training Conducted on: ____________ (DATE)
2. Mandatory pre-excavation briefing conducted on: ____________ (DATE)
3. Does this job require special training: YES___ NO___

ELECTRICAL SAFETY

1. Are all electrical devices grounded, double insulated, or GFCI protected? YES___ NO___ N/A___
2. Have all power cords and tools been visually inspected? YES___ NO___ N/A___

SURFACE ENCUMBRANCES

1. Have all surface encumbrances that are located so as to create a hazardto employees been removed or supported, as necessary, to safeguard employees? YES___ NO___ N/A___

UNDERGROUND INSTALLATIONS

1. Have the estimated locations of all underground installation been determined prior to excavation? YES___ NO___ N/A___
2. Have utility companies been contacted and advised of proposed work? YES___ NO___ N/A___
3. Are underground installations protected, supported or removed while excavations are open? YES___ NO___ N/A___

ACCESS AND EGRESS

1. Are structural ramps that are used solely by personnel as a means of access or egress from excavations designed by a competent person? YES___ NO___ N/A___
2. Are structural ramps that are used for access and egress of equipment designed by a competent person qualified in structural design and constructed in accordance with the design? YES___ NO___ N/A___
3. Are ramps and runways constructed so structural members are connected to prevent displacement? YES___ NO___ N/A___

4. Are structural members used for ramps and runways of uniform thickness? YES___ NO___ N/A___
5. Are cleats used in connecting runway structural members attached in a manner to prevent tripping? YES___ NO___ N/A___
6. Are structural ramps used in lieu of steps provided with cleats or other surface treatment to prevent slipping? YES___ NO___ N/A___

MEANS OF EGRESS FOR TRENCHES DEEPER THAN 4 FEET

1. Are stairways, ladders, or ramps provided every 25 feet? YES___ NO___ N/A___

EXPOSURE TO VEHICULAR TRAFFIC

1. Are personnel exposed to public vehicular traffic wearing reflectorized or high visibility vests? YES___ NO___ N/A___

EXPOSURE TO FALLING LOADS

1. Are employees prohibited from standing underneath loads handled by lifting or digging equipment? YES___ NO___ N/A___
2. Are employees prohibited from standing next to vehicles being loaded or unloaded? YES___ NO___ N/A___

WARNING SYSTEMS FOR MOBILE EQUIPMENT

1. Are warning systems such as barricades, hand or mechanical signals, or stop logs utilized when mobile equipment is operated adjacent to or at the edge of an excavation? YES___ NO___ N/A___

TESTING FOR HAZARDOUS ATMOSPHERES

1. Are the atmospheric hazards that can be reasonably expected to exist in excavations greater than 4 feet deep tested and controlled? YES___ NO___ N/A___

	READING:		TIME:	INITIAL:
2. Test for Oxygen Content:	________	% 02 (19.5% Minimum)	________	________
3. Test for Flammable Concentrations:	________	% LEL (10% Maximum)	________	________
4. Test for Toxic Concentration:	________	PPM of ________	________	________

5. Is testing conducted as often as necessary to ensure safety or personnel? YES___ NO___ N/A___

EMERGENCY RESCUE EQUIPMENT

1. Is emergency rescue equipment such as SCBA, safety harness and line, or basket stretcher readily available and attended when hazardous atmospheric conditions exist? YES___ NO___ N/A___
2. Are employees who enter bell-bottom pier holes or other similar deep and confining excavations wearing a body harness with a life-line? YES___ NO___ N/A___

PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

1. Are employees prohibited from entering excavations that have accumulated water? YES___ NO___ N/A___
2. Is water being controlled or prevented from accumulating in excavation by the use of water removal equipment? YES___ NO___ N/A___
3. Is water control equipment operation being monitored by a competent person? YES___ NO___ N/A___
4. Are diversion ditches, dikes, or other suitable means used to prevent surface water from entering excavation? YES___ NO___ N/A___
5. Are excavations subjected to run-off from heavy rain immediately re-inspected by a competent person? YES___ NO___ N/A___

STABILITY OF ADJACENT STRUCTURES

1. Are support systems such as shoring, bracing, or underpinning provided to ensure stability of adjoining structures (i.e., buildings, walls) endangered by excavation activities? YES___ NO___ N/A___
2. Has any excavation below the level of the base or footing of foundations or retaining walls been:
   - Provided with a support system such as under pinning to ensure the safety of employees and stability of the structure YES___ NO___ N/A___
   - Performed in stable rock YES___ NO___ N/A___
   - Determined by a registered professional engineer that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity YES___ NO___ N/A___
   - Determined by a registered professional that the excavation work will not pose a hazard to employees YES___ NO___ N/A___
3. Is the undermining of sidewalks and pavement structures prohibited? YES___ NO___ N/A___

PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

1. Is adequate protection provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face? YES___ NO___ N/A___
2. Are employees protected from excavated or other material and equipment by placing this material a minimum of two (2) feet from the edge of excavations or by the use of retaining devices? YES___ NO___ N/A___

INSPECTIONS

1. Are daily inspections of excavations where employee exposure can be reasonably anticipated being done by the competent person? YES___ NO___ N/A___
2. Are inspections being performed by a competent person after every rainstorm or other hazard increasing occurrence? YES___ NO___ N/A___
3. Are employees removed from the excavation if the competent person finds evidence at any time of a situation that could result in a possible cave-in, protective system failure, hazardous atmosphere or other hazardous condition? YES___ NO___ N/A___

FALL PROTECTION

1. Are standard guardrails provided on walkways and bridges that cross over excavations? YES___ NO___ N/A___
2. Are all remotely located excavations adequately barricaded or covered? YES___ NO___ N/A___
3. Are temporary wells, pits, shafts and similar exploratory operations backfilled upon completion? YES___ NO___ N/A___

I have inspected the excavation described in this permit:

_______________________________ _______________________________

(Signature of Competent Person) (Date)

EXHIBIT VIII

CONFINED SPACE PROCEDURE/PERMIT

1. OBJECTIVE

OHM Remediation Services Corp. (OHM) shall enforce this procedure as a means of protecting the health and safety of workers while entering, working in, and exiting confined spaces. Before entry, the worker will be made aware of the hazards of confined space work and the safe work practices necessary.

2. PURPOSE

The purpose of this procedure is to establish confined space entry standards for all OHM employees. This procedure meets and exceeds the guidelines in the Occupational Safety and Health Administration (OSHA) proposed Confined Space Entry standard 29 CFR 1910.146.

3. PROCEDURE

3.1 Permitting - All "permit required confined space" entries will be proceeded by the completion of a confined space entry permit. The OHM confined space entry permit follows this procedure.

3.2 Written Rescue Procedure - Prior to any confined space work, a site specific written rescue plan will be developed that addresses minimum requirements.

3.2.1 Rescue

- The equipment required to rescue an unconscious victim must be in-place before the first person enters the confined space.
- A trained stand-by person will be assigned to each confined space with a fully charged SCBA or airline and egress unit.
- The stand-by is to keep life lines clear, to maintain contact with all workers within the confined space and to summon help if needed.
- The stand-by must never enter the confined space unless relieved by rescue assistance.
- The stand-by may attempt rescue by lifeline while waiting for rescue assistance.

4. PERMIT SYSTEM

All confined space entry permits will address the following:

- Location
- Hazards-Isolation
- Lockout / Tagout
- PPE and special equipment
- Air monitoring requirements and results of such monitoring
- Personal monitoring
- Training required
- Stand-by persons to be present as alternates
- Communication procedures
- Emergency / rescue procedures
- Confined space classification
- Posting of notification

6. TRAINING

OHM will train employees involved in confined space entry and confined space rescue on the hazards associated with confined space work. This training will, as a minimum, cover the following:

- Hazard recognition
- Emergency entry and exit
- Respirator use
- First aid
- Lock-out procedures
- Safety equipment
- Rescue drills
- Permit system
- Work practices
- Communication requirements

7. TESTING AND MONITORING

7.1 Initial Monitoring - Entry into a confined space is prohibited until initial testing of the atmosphere for oxygen content and toxic gas concentration is conducted from the outside. Initial monitoring gives critical information concerning oxygen level, flammability and toxicity hazards.

7.2 Hot Work - All hot work is prohibited in confined space where monitoring indicates that there are flammable compounds in excess of 10% of the Lower Explosive Limit (LEL). The monitoring device will be intrinsically safe for flammable atmospheres or explosion proof. If hot work must be performed in the confined space, a hot work permit must be completed. Cutting gas cylinders and welding machines will not be taken into confined space.

7.3 Calibration - All monitoring equipment will be calibrated before each use and those calibrations will be logged in the equipment records. The calibration record will be kept for a minimum of one year from the date of measurement.

7.4 Oxygen Requirement - The percent oxygen for entry will not be less than 19.5% for confined space entry without supplied air respirators. If elevated (greater than 22%) oxygen levels are detected, the confined space must be ventilated prior to any "hot work". Any oxygen reading above or below 20.9% will be reported to the site safety officer before further entry is attempted.

7.5 Permissible Exposure Limits (PEL) - OHM employees will be provided with and will be required to properly use protective clothing and respiratory protective equipment when contaminants in the atmosphere reach or exceed the PEL. The personal protective equipment (PPE) selected will reduce exposure to contaminants to acceptable levels.

8. LABELING AND POSTING

8.1 Any signs warning of dangers in the work area will be in English and the predominant language of any non-English reading workers.

8.2 All entrances to confined spaces at OHM facilities and on-going projects will have appropriate signs posted. The signs should include the following, if applicable:

Danger
Confined Space Entry
Entry by Permit Only

The following statements shall be added where necessary:

Respirator Required for Entry
Lifeline Required for Entry
Hot Work Permitted
or
No Hot Work

8.3 Emergency numbers will be conspicuously posted near the work area or at the telephone nearest the work area.

9. SAFETY EQUIPMENT AND PPE

The site safety officer or site supervisor will determine and list on the confined space permit the necessary safety equipment and PPE. The site supervisor will ensure that the safety equipment is properly used and is maintained in the proper working condition. These items may include, but are not limited to:

- Eye / face protection
- Head protection
- Foot protection
- Protective clothing
- Hearing protection
- Respiratory protection
- Safety bells/Alarms
- Harnesses
- Lifelines
- Wrist harnesses
- Life jackets
- Fall nets
- Barricades
- Retrieval systems

10. WORK PRACTICES

10.1 Purge and Ventilation - During purge and ventilation procedures, blower controls will be a safe distance from the confined space. Initial testing is to be conducted prior to purge/ventilation to determine what precautions are necessary. If a flammable atmosphere exists, all electrical equipment must be intrinsically safe or explosion proof. Continuous ventilation will be required when welding or painting in a confined space, or where a toxic atmosphere may form from desorption from walls, or evaporation of chemicals. Ventilation systems must not prevent egress from the area or interfere with communications.

10.2 Isolation / Lock-out / Tag-out - Each confined space will have isolation procedures specifically developed. The confined space must be completely isolated from all systems by physical disconnect, block and bleed, or blanking and tagging. Electrical systems must be de-energized and locked-out. All systems should be checked for stored energy before any entry into confined space is attempted.

10.3 Cleaning - Cleaning procedures will be reviewed and approved by the qualified person. Initial cleaning will be conducted from outside the tank whenever possible to minimize exposures to employees. Cleaning may be accomplished by flushing with water or chemical cleaners. At times the use of a "Butterworth" cleaning head may be required. In any case, gross material must be removed before entry is performed.

11. EQUIPMENT AND TOOLS

All equipment that is used in confined space will be inspected and as a minimum, will meet the following requirements:

- Hand tools will be kept clean and in proper working condition.
- Electric tools, equipment and lighting will be intrinsically safe or explosion proof for flammable atmospheres and be equipped with ground fault circuits interrupters (GFCI).
- Extension cords will be industrial quality, 3 wire and 12 gauge as a minimum.
- Cylinders of compressed gas will never be taken into a confined space, with the exception of SCBA tanks or life saving equipment.
- Ladder and scaffolding will meet or exceed OSHA requirements in 29 CFR 1910.25-28.

OHM Corporation

CONFINED SPACE ENTRY PERMIT

Permit No.________________

Project No.________________

Good on this Date Only:________________ From:__________ a.m. p.m. To:__________ a.m. p.m.

Location:________________ Description of Task:________________

Workers Authorized to Enter	Work Monitors	Rescue Personnel

EMPLOYEE PRE-ENTRY BRIEFING

Pre-Entry Briefing Conducted by: ________________ (Name) __________ (Date)

CONFINED SPACE PREPARATION

1. Is Illumination Adequate?	YES____	NO____	
2. Must Electrical Devices be Intrinsically Safe or Explosion Proof?	YES____	NO____	
3. Are Non-Sparking Tools Required?	YES____	NO____	
4. Are GFCI's In Use?	YES____	NO____	
5. Have All Power Cords and Tools Been Visually Inspected?	YES____	NO____	N/A____
6. Fire Extinguisher Available at Entrance.	YES____	NO____	TYPE____
7. Eye Wash/Safety Shower Available.	YES____	NO____	N/A____
8. Is Rescue SCBA Available?	YES____	NO____	N/A____
9. Work Area Isolated with Signs/Barriers?	YES____	NO____	N/A____
10. All Energy Sources Locked/Tagged Out?	YES____	NO____	N/A____
11. All Input Lines Capped/Blinded?	YES____	NO____	N/A____
12. Vessel Contents Drained/Flushed/Neutralized?	YES____	NO____	N/A____
13. Vessel Cleaned/Purged?	YES____	NO____	N/A____
14. Ventilation Provided 30 Minutes Before Entry?	YES____	NO____	N/A____
15. Communication Requirements	VISUAL____	VOICE____	RADIO____
16. Level of Respiratory Protection.	B____	C____	D____
17. Type of Chemical Protective Clothing Required.	TYVEK____	SARAN____	ACID____
18. Type of Glove Material Required.	NITRILE____	PVC____	ACID____

PRE-ENTRY ATMOSPHERIC TESTING

	Reading:	Time:	Initials:
1. Test for Oxygen Content:	____ % O_2	____	____
2. Test for Flammable Concentration:	____ % LEL	____	____
3. Test for Toxic Concentration:	____ ppm of ____ (TLV = ____)	____	____
4. Continuous Monitoring Required?	YES____ NO____		

EMERGENCY/RESCUE PROCEDURES

1. Is a Site Specific Rescue Plan Required? YES____ NO____
2. Are Personnel Trained for Confined Space Rescue Available? YES____ NO____
3. If NO, Has an Outside Agency Been Notified? YES____ NO____
4. Outside Rescue Agency Name:________________ Phone No.__________

ENTRY/EGRESS REQUIREMENTS

1. Are Ladders Required for Entry? YES____ NO____
2. Are Vertical Extraction/Rescue Devices Required? YES____ NO____
3. Is Fall Protection Required? YES____ NO____

OTHER POTENTIAL HAZARDS

1. Noise YES____ NO____ CONTROL________
2. Heat Stress YES____ NO____ CONTROL________
3. Cold Stress YES____ NO____ CONTROL________
4. Biological Agents YES____ NO____ CONTROL________

SUBCONTRACTOR NOTIFICATION

Contractor Notified of: Permit Conditions ________ Potential Hazards ________ N/A ________

PERMIT AUTHORIZATION

I certify that I have inspected the work area for safety and reviewed all safety precautions recorded on this permit.

Permit Authorized by (Signature): ________________________

EXHIBIT IX

COLD STRESS

1. OBJECTIVE

OHM Remediation Services Corp. (OHM) recognizes that work must be performed in various weather conditions, including cold climates. In order to minimize cold related illnesses, site supervisors are to be aware of the symptoms of and environmental conditions that lead to cold-related illnesses the appropriate steps to take to prevent their occurrence.

2. PURPOSE

This procedure describes the causes, symptoms, treatment and/or prevention of cold-related illness.

3. GENERAL INFORMATION

3.1 When the temperature of the surrounding air or water are much colder than the worker, the body's physical processes must increase to maintain thermal balance. Shivering is the body's attempt to generate increased heat.

3.2 The lower limit of efficiency for prolonged outdoor work is -24 degrees F.

3.3 Shivering, pain and numbness are not trustworthy indicators to cold exposures, because prolonged cold exposure numbs all body sensations.

3.4 Wind-chill temperature is a better means of evaluation as it takes into account the wind's ability to strip heat from the body through convection.

3.5 Protective clothing that is wet with sweat or from rain will cause heat loss through conduction.

4. COLD INJURY

4.1 TRENCH FOOT occurs as a result of extended exposure of the feet to cold and moisture. Capillary walls of the feet are injured, resulting in tingling, itching and pain. Blisters may form followed by ulceration of the skin.

4.2 FROST-NIP is localized superficial freezing of extremities such as ears, nose, toes, and fingers. Initially there is a dark bluish color due to bleeding under the skin which at times can become gangrenous. Worker experiencing frost nip are susceptible to future injury and should avoid chilling.

4.3 FROSTBITE occurs when the moisture in the skin actually freezes, forming ice crystals, resulting in the damage of skin cells. The injured area becomes red, then blue/red. A burning pain is noted initially, then pain decreases and numbness sets in. The skin becomes waxy pale in appearance because of lack of oxygen. The ears, nose, toes and fingers are most susceptible. Damaged area can become gangrenous resulting in the loss of tissue, finger tips and toes.

4.4 HYPOTHERMIA occurs when heat production of the body is not sufficient to replace heat lost to the environment. The results are a lowering of the core body temperature, the pulse rate slows, muscular weakness occurs, mental abilities dull and the worker becomes uncoordinated. Signs of hypothermia are evident at 95 degrees Fahrenheit body core temperature and consciousness is lost between 89.6 - 86.0 degrees Fahrenheit. At lower core temperatures, cardiac arrest is possible.

Exposure to cold water decreases the body core temperature rapidly and consciousness is quickly lost. Workers on or over water should be acutely aware of the danger of immersion during cold weather.

It has been known for years that hypothermia results in dulling of the senses and could result in poor decision making. Workers that are exposed to extreme cold should not be given tasks that are critical to their health and safety and that of others.

5. PREVENTION

Prevention of hypothermia and other cold injuries is best accomplished by protecting workers from cold and moisture. Clothing is the most important factor in prevention of injury. Personnel working on land should layer clothing with outer layer being wind and water resistant. The layers should be capable of being vented at wrist, neck and waist to reduce wetting by perspiration. Feet should be kept dry and socks should be changed when they become wet. Gloves which protect the hands from cold but allow freedom of movement are necessary. Never allow bare skin to contact metal surfaces at sub-zero temperatures.

EXHIBIT X

AIR SAMPLING PLAN

EXHIBIT X

AIR SAMPLING PLAN

DRAFT
AIR SAMPLING PLAN FOR RAPID RESPONSE REMOVAL OF CONTAMINATED SOILS PESTICIDE STORAGE FACILITY AND COYLER MANOR SITES, FORT RILEY, KANSAS

CONTRACT NO. DACW45-94-D-0005
DELIVERY ORDER NO. 2

Submitted to:

United States Army Corps of Engineers
Omaha, Nebraska

Prepared by:

OHM Remediation Services Corporation

Approved by:

Guy Gallello, Jr.
Senior Project Chemist
Midwest Region

G. Jack Herzig
Manager, Field Analytical Services
Midwest Region

January 6, 1994
Project 15480

TABLE OF CONTENTS

1.0 INTRODUCTION

OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, has prepared this air sampling plan for use during the excavation activities by OHM at Fort Riley, Kansas. This air sampling plan describes the methods and procedures to be employed when air samples are collected. Air samples will be collected during excavation activities in the contaminated areas of the site.

This document is intended to provide guidelines for the air sampling, the analysis of the samples, and the reduction of the data.

This plan also states the guidelines to be utilized to collect and analyze the air samples as well as identify key personnel in the implementation of the program.

2.0 PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

The United States Army Corps of Engineers (USACE), Kansas City District, on behalf of Fort Riley, requested that the USACE Omaha District utilize the Rapid Response Program to execute removal actions at the Pesticide Storage Facility (PSF) and the Coyler Manor sites in Fort Riley, Kansas. The Omaha District reviewed and accepted this project based on a moderate risk to human health, a moderate risk to a drinking water source of the environment, and to achieve compliance with current regulations.

This Rapid Response project will consist of contaminated soil removals at two sites at Fort Riley, Kansas: the PSF and Coyler Manor. At the PSF, the primary contaminants to be removed are DDT, dieldrin, heptachlor, arsenic, chlordane, and polyaromatic hydrocarbons (PAHs). At the Coyler Manor, the contaminant to be removed is lead. The purpose of the remedial actions at each of the sites is to remove all soils containing contaminants above the cleanup levels specified.

2.1.1 Site History

The PSF was constructed in 1941 to serve as a general warehouse facility. The building has been used to store pesticides and herbicides since at least 1973. In 1984, the facility was modified to meet federal standards for safe storage of pesticides.

The lead-contaminated soil area of concern for this project (Coyler Manor) was first identified as an area suspected of being contaminated with lead bullet fragments in 1992 in the Installation Wide Site Assessment. In 1993, the area was investigated and found to be significantly contaminated with lead.

2.2 DESCRIPTION

This action requires the excavation of lead- and pesticide-contaminated soils at Fort Riley, Kansas. Following the excavation of contaminated soils, the soils will be stockpiled and impacted areas will be restored.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

3.1 PROJECT MANAGEMENT PERSONNEL

The project management support team for the contract includes a project manager, a site supervisor, a contracts administrator, and the project staff. The project management team provides a single point of contact within OHM for the United States Army Corps of Engineers (USACE) contracting officer and technical staff. The team will implement the activities specified in the project Contractor's Sampling and Analysis Plan (CSAP). The project management team will verify that the air sampling program is implemented as described in this plan and that sample results are distributed to USACE in a timely fashion. It is the responsibility of the project management team to implement the quality practices established in this Air Sampling Plan.

3.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project manager is responsible to provide the overall direction of the project executed under his supervision including the application of the air sampling program. The project manager for the Fort Riley project is Mr. Phil Connor.

The site supervisor is responsible for providing the day-to-day supervision of the assigned project including the fulfillment of the quality assurance (QA) responsibilities. The site supervisor is responsible for ensuring that the air sampling equipment is available, including the support necessary to operate the equipment. The site supervisor is responsible for reviewing the results of the air sampling program to verify that the fugitive dust emissions are below the action levels established by USACE. The site supervisor is to be determined.

The air sampling technician is responsible for implementing the elements of this plan including the collection and the calibration of the air sampling equipment. The air sampling technician is also responsible for summarizing the data and submitting a report to the site supervisor in a timely fashion. He is also responsible for notifying the site supervisor of nonconformances concerning the air sampling program and providing appropriate documentation to confirm that the nonconformance has been resolved. The air sampling technician is to be determined.

Air samples will be analyzed for lead by Chemtex Laboratories (CHEMTEX). CHEMTEX is accredited by the American Industrial Hygiene Association to analyze industrial hygiene samples, including air samples for the presence of heavy metals. Dr. Reddy is the manager of the Industrial Hygiene Laboratory and will serve as the contact for the sample analysis. The address for the facility is provided below:

Chemtex Laboratories
3082 25th Street
Port Arthur, TX 77642
409-983-4575

Air samples collected for pesticide analysis will be analyzed by MDS Laboratories (MDS). MDS is accredited by the American Industrial Hygiene Association to analyze industrial hygiene samples. Fred Usbeck is the Laboratory Director, and he will serve as the contact for sample analysis. The address for the facility is provided below:

MDS Laboratories
4418 Pottsville Pike
Reading, PA 19605
215-921-8833
215-921-9667 (fax)

4.0 QUALITY ASSURANCE OBJECTIVES

Quality assurance (QA) objectives have been established for each of the elements of the air sampling program. In this section, OHM defines the type of measurements to be collected, the uses and users of these measurements, and the QA objectives.

OHM will perform air sampling at the perimeter of the site during intrusive activities in the exclusion area and will collect air samples in the breathing zone of selected personnel who are likely to encounter airborne concentrations of lead in excess of the limits specified by the Occupational Safety and Health Administration (OSHA). Air samples will also be collected in the breathing zone of individuals performing intrusive activities near the PSF, who are likely to encounter airborne concentrations of pesticides in excess of the limits specified by OSHA. Analyses to be performed with each of these activities are listed in Table 4.1.

TABLE 4.1

SUMMARY OF AIR SAMPLING ACTIVITIES

Activity	Matrix	Parameter	Methods
High Volume Perimeter Air Sample	Glass Fiber Filter	Total Lead	Modified NIOSH 7082
Personnel Air Sample	Mixed Cellulose Ester Filter	Total Lead	NIOSH 7082
	Polyurethane Foam (PUF) Sample Tube	Organochlorine Pesticides: DDT, Dieldrin, Chlordane, Heptachlor	USEPA IP-8

The air samples collected at the perimeter of the site will be analyzed in order to confirm that fugitive emissions of total airborne lead were less than the action level specified by USACE. The personnel air samples will be used to document the concentrations of airborne lead and pesticides that are encountered by personnel working in the exclusion area.

The background concentration of airborne lead will be confirmed before intrusive work in the exclusion zone begins. The perimeter air samplers will be operated at selected locations around the site for approximately 7 hours. The background concentration of airborne lead will be calculated using the arithmetic average of the available results.

The action levels for each of these criteria are listed in Table 4.2.

TABLE 4.2

ACTION LEVELS

Activity	Parameter	Method	Action Level
High Volume Perimeter Air Sample	Total Lead	NIOSH 7082	30 µg/m^3 (micrograms)
Personnel Air Sample	Total Lead	NIOSH 7082	0.05 (milligrams per cubic meter [mg/m^3])
	Organochlorine Pesticides:		
	Chlordane	USEPA IP-8	0.5 mg/m^3
	DDT	USEPA IP-8	1.0 mg/m^3
	Dieldrin	USEPA IP-8	0.025 mg/m^3
	Heptachlor	USEPA IP-8	0.5 mg/m^3

There are no provisions to prepare a spike sample for the air sampling program. The accuracy and precision of the analysis are based on the method.

OHM will measure the presence of contamination on sampling equipment by submitting a blank mixed cellulose ester (MCE) filter (for lead) and a blank PUF sample tube (for pesticides) with each batch of personnel samples. The sampling equipment will be decontaminated before sampling begins and in between sampling events. The sample technician will use sample gloves to minimize the spread of contamination from the sample to equipment and to minimize cross contamination.

5.0 FIELD ACTIVITIES

Air samples will be collected around the perimeter of the exclusion area during the course of this project. The samples will be collected using battery operated sample pumps, equivalent to a Du Pont Alpha 1, set at a high flow rate. The pumps will be mounted approximately 4 feet from the surface of the ground. The suspended dust will be collected on a 37-millimeter MCE filter.

Personnel air samples for lead will be collected using a battery-operated sample pump, equivalent to a Du Pont Alpha 1. The pump is attached to an individual and worn during the work performed in the exclusion area. The suspended dust is collected on a 37-millimeter MCE filter which is positioned in the breathing zone of the individual.

Personnel air samples for pesticides will also be collected using battery operated sample pumps, equivalent to Du Pont Alpha 1. The pumps will be attached to individuals performing intrusive activities in the exclusion zone, and samples will be collected on a 76-mm PUF sorbent plug, contained in a glass tube (22 mm OD x 100 mmL).

The locations of the perimeter sampling pumps will be determined at the beginning of the project, and five pumps will be positioned on each side of the perimeter surrounding the excavation area with two pumps on the perimeter bordering residences. The positions of the pumps will be documented on a site map. The perimeter samples will be collected for the entire period that intrusive work is performed in the exclusion zone (approximately 7 hours).

One of the downwind samples will be submitted to the laboratory for analysis, representing each day where intrusive work is performed in the exclusion zone. The remaining four samples will be archived by the OHM field laboratory. The remaining four samples will be analyzed in any event where the concentration is observed to be in excess of 1 percent of the action level specified in Table 4.2.

Personnel sampling pumps will be worn by persons assigned to work in the exclusion zone. One person performing intrusive activities in the excavation of lead will be sampled for the duration of work. Two employees performing work in the pesticide contaminated area will wear sample pumps during those operations.

Personnel samples will run for the entire shift. The person wearing the pump will be assigned to work in the exclusion zone but may work in the support zone as is required by the job assignment. In this way, it is possible to measure the 8-hour, time weighted average exposure for that individual on that specific day. This sampling regiment is required by OSHA and is the basis for the permissible exposure limit.

Both the perimeter and personnel samples will remain in their sealed sample cassettes. The ends of their sample cassettes will be sealed with plugs, provided by the laboratory. No preservation is required to maintain the integrity of the sample. There is no limit on the holding time for the air samples. The PUF samplers will be wrapped in the (original) aluminum foil and placed in sealed, labeled containers. The samples must be stored at -10 degrees Celsius until analyzed (cooler and blue ice).

6.0 SAMPLE CHAIN OF CUSTODY, PACKAGING, AND TRANSPORTATION

The air sampling activities will comply with the specifications listed in Section 6.0 of the CSAP, which concerns labeling, sample custody, and chain-of-custody records.

Samples will be properly packaged for shipment and transported to the analytical laboratory via a courier. The samples will be accompanied with a separate chain-of-custody record form showing the contents of the package. The original record will accompany the shipment, and a copy will be retained in the project files. The samples will be delivered to the sample control department at the laboratory. The chain-of-custody record form will be updated, and the samples will be prepared for analysis.

When all of the analyses have been completed and results have been accepted by USACE, all data sheets, chain-of-custody record forms and laboratory records will be archived as part of the permanent documentation. Samples will also be retained after analyses are completed. These samples may be disposed of only when USACE permits or at the end of the project. OHM requires that samples be retained for a minimum of 14 days after the final report has been submitted to OHM.

7.0 ANALYTICAL PROCEDURES

Air samples will be analyzed by CHEMTEX and MDS or as designated by USACE. No analysis is proposed for the field laboratory.

CHEMTEX and MDS will employ established methods for the analysis of the air samples. The methods for analysis are listed in Table 4.2.

The perimeter air samples will be analyzed for the presence of total lead. The personnel samples will be analyzed for the presence of total lead and the pesticides designated.

The laboratory will analyze the filters (for lead) using flame atomic absorption unit. The method is capable of detecting approximately 0.1 μg of lead for the personnel samples (37-millimeter MCE filter). This equates to a minimum detectable concentration of less than 0.1 $\mu g/m^3$ of lead in the air. The PUF tubes will be analyzed for pesticides using gas chromatography-electron capture detector. The laboratory is capable of detecting organochlorine pesticides in concentrations well below the designated action levels.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

The flowrate of the air being sampled by the personnel pumps will be measured using a primary standard, equivalent to a Gillian Gillabrator. The calibration instrument uses a frictionless piston to measure the volume of air displaced in a specific period of time. The instrument calculates the flowrate in liters of air per minute. The flowrate is measured at the beginning of the sampling period and at the end of the sampling period. The average flowrate is calculated by arithmetic average of the beginning and ending flowrate.

The average flowrate is used to calculate the total volume of air sampled. The flowrate multiplied by the time elapsed represents the total volume of air. The calculated volume of air is provided to the laboratory in order to calculate the average concentration of the contaminant.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

The laboratory will calculate the average concentration of the desired contaminants for both the perimeter samples and the personnel samples. The laboratory will submit the following information to OHM before the final report is prepared:

- Copies of the sample logs
- Copies of the extraction logs with extraction methods
- Copies of the standards logs
- Copies of the instrument logs with documentation of analytical methods, initial calibrations and continuing calibration
- All raw data generated during the analysis of samples including quality control (QC) samples
- Analytical results
- QC information which will provide percent recovery, relative percent difference, control limits, blanks analyzed, and any other QC information which may be site specific.

The project chemist will review the above information for data quality, completeness, and validity. This information will be summarized and submitted to USACE in a report. The original data will be made available to USACE upon request.

10.0 PREVENTATIVE MAINTENANCE

No preventive maintenance is recommended by the manufacturer for the operation of the air sampling equipment. Repairs and maintenance must be performed by the manufacturer.

EXHIBIT XI

SAFETY INSPECTION PROJECT SITE FORM

OHM Corporation

OHM Corporation
Project Site Inspection Checklist

Project Name: ________________
Project Number: ________________
Project Location: ________________
Site Supervisor: ________________
Inspector's Name: ________________

	YES	NO
MEDICAL AND FIRST AID		
1. Are First Aid Kits accessible and identified?	___	___
2. Are emergency eye wash and safety showers available?	___	___
3. Are daily logs for first aid present and up to date?	___	___
4. Are First Aid Kits inspected weekly?	___	___
PERSONAL PROTECTIVE EQUIPMENT		
1. Have levels of personnel protection been established?	___	___
2. Do all employees know their level of protection?	___	___
3. Are respirators used decontaminated, inspected, and stored according to standard procedures?	___	___
4. Have employees been fit-tested?	___	___
5. Is defective personal protective equipment tagged?	___	___
6. Does compressed breathing air meet CGA Grade "D" minimum?	___	___
7. Are there sufficient quantities of safety equipment and repair parts?	___	___
8. Does Level D protection consist of safety glasses, hard hats, and steel toe boots?	___	___
FIRE PREVENTION		
1. Is smoking prohibited in flammable storage areas?	___	___
2. Are fire lanes established and maintained?	___	___
3. Are flammable dispensing systems grounded and bonded?	___	___
4. Are approved safety cans available for storage of flammable liquids?	___	___
5. Has the local fire department been contacted?	___	___
6. Are fire extinguishers available near refueling areas?	___	___
AIR MONITORING		
1. Is air monitoring being conducted as required by the site safety plan?	___	___
2. Are air monitoring instruments calibrated daily?	___	___
3. Is the air monitoring logbooks up to date?	___	___
4. Are user manuals available?	___	___
5. Are instruments clean and charged?	___	___

WELDING AND CUTTING (29 CFR 1926 Subpart J)

1. Are fire extinguishers present at welding and cutting operations? ___ ___
2. Are confined spaces; such as, tanks, pipelines, and trenches; tested prior to cutting and welding operations? ___ ___
3. Are Hot Work Permits available? ___ ___
4. Are proper helmets, goggles, aprons, and gloves available for welding and cutting operations? ___ ___
5. Are welding machines properly grounded? ___ ___
6. Are oxygen and fuel gas cylinders stored a minimum of 20 feet apart? ___ ___
7. Are only trained personnel permitted to operate welding and cutting equipment? ___ ___

HAND AND POWER TOOLS (29 CFR 1926 Subpart I)

1. Are defective hand and power tools tagged and taken out of service? ___ ___
2. Is eye protection available and used when operating power tools? ___ ___
3. Are guards and safety devices in place on power tools? ___ ___
4. Are power tools inspected before each use? ___ ___
5. Are non-sparking tools available? ___ ___

MOTOR VEHICLES

1. Are vehicles inspected daily? ___ ___
2. Are personnel licensed for the equipment they operate? ___ ___
3. Are unsafe vehicles tagged and reported to supervision? ___ ___
4. Are vehicles shut down before fueling? ___ ___
5. When backing vehicles, are spotters provided? ___ ___
6. Is safety equipment on vehicles? ___ ___
7. Are loads secure on vehicles? ___ ___
8. Are vehicle occupants using safety belts if provided? ___ ___

EMERGENCY PLANS

1. Are emergency telephone numbers posted? ___ ___
2. Have emergency escape routes been designated? ___ ___
3. Are employees familiar with the emergency signal? ___ ___
4. Has the emergency route to the hospital been established and posted? ___ ___

MATERIALS HANDLING

1. Are materials stacked and stored as to prevent sliding or collapsing? ___ ___
2. Are flammables and combustibles stored in non-smoking areas? ___ ___
3. Is machinery braced when personnel are performing maintenance? ___ ___
4. Are tripping hazards labeled? ___ ___
5. Are semi-trailers chocked? ___ ___
6. Are fixed jacks used under semi-trailers? ___ ___
7. Are riders prohibited on materials handling equipment? ___ ___
8. Are cranes inspected as prescribed and logged? ___ ___
9. Are OSHA approved manlifts provided for the lifting of personnel?
10. Are personnel in manlifts wearing approved fall protection devices? ___ ___

FIRE PROTECTION

1. Has a fire alarm been established? ___ ___
2. Do employees know the location and use of all fire extinguishers? ___ ___
3. Are fire extinguisher locations marked? ___ ___
4. Are combustible materials segregated from open flames? ___ ___
5. Have fire extinguishers been professionally inspected during the last year? ___ ___
6. Are fire extinguishers visually inspected monthly? ___ ___

ELECTRICAL (29 CFR 1926 Subpart K)

1. Is electrical equipment and wiring properly guarded? ___ ___
2. Are electrical lines, extension cords, and cables guarded and maintained in good conditions? ___ ___
3. Are extension cords kept out of wet areas? ___ ___
4. Is damaged electrical equipment tagged and taken out of service? ___ ___
5. Have underground electrical lines been identified by proper authorities? ___ ___
6. Has positive lock-out system been established by a certified project electrician? ___ ___
7. Are GFCI's being used as needed? ___ ___
8. Are extension cords being inspected daily for ground continuity and structural integrity? (i.e., group pin in place, no unapproved splices) ___ ___
9. Are warning signs exhibited on high voltae equipment (250V or greater)? ___ ___
10. Is extension cord inspection documented?

CRANES AND RIGGING (29 CFR 1926.550)

1. Are cranes inspected daily? ___ ___
2. Are crane swing areas barricaded or demarked? ___ ___
3. Is all rigging equipment tagged with an identification number and rated capacity? ___ ___
4. Is rigging equipment inspection documented? ___ ___
5. Are slings, chains, and rigging inspected before each use? ___ ___
6. Are damaged slings, chains, and rigging tagged and taken out of service? ___ ___
7. Are slings padded or protected from sharp corners? ___ ___
8. Do employees keep clear of suspended loads? ___ ___
9. Are employees in the lift area wearing hard hats? ___ ___

COMPRESSED GAS CYLINDERS

1. Are breathing air cylinders charged only to prescribed pressures? ___ ___
2. Are like cylinders segregated in well ventilated areas? ___ ___
3. Is smoking prohibited in cylinder storage areas? ___ ___
4. Are cylinders stored secure and upright? ___ ___
5. Are cylinders protected from snow, rain, etc.? ___ ___
6. Are cylinder caps in place before cylinders are moved? ___ ___
7. Are fuel gas and 02 cylinders stored a minimum of 20 feet apart? ___ ___
8. Are propane cylinders stored and used outside the structure? ___ ___

SCAFFOLDING (29 CFR 1926.451)

1. Is scaffolding placed on a flat, firm surface? ___ ___
2. Are scaffold planks free of mud, ice, grease, etc.? ___ ___
3. Is scaffolding inspected before each use? ___ ___
4. Are defective scaffold parts taken out of service? ___ ___
5. Does mobile scaffold height exceed 4 times the width or base dimension? ___ ___
6. Does scaffold planking overlap a minimum of 12 inches? ___ ___
7. Does scaffold planking extend over end supports between 6 to 18 inches? ___ ___

8. Are employees restricted from working on scaffolds during storms and high winds? ____ ____
9. Are all pins in place and wheels locked? ____ ____
10. Is perimeter guarding (top rail, mid rail, and toe board) present? ____ ____

WALKING AND WORKING SURFACES

1. Are ladders a Type I or Type II? ____ ____
2. Are accessways, stairways, ramps, and ladders clean of ice, mud, snow, or debris? ____ ____
3. Are ladders being used in a safe manner? ____ ____
4. Are ladders kept out of passageways, doors, or driveways? ____ ____
5. Are broken or damaged ladders tagged and taken out of service? ____ ____
6. Are metal ladders prohibited in electrical service? ____ ____
7. Are stairways and floor openings guarded? ____ ____
8. Are safety feet installed on straight and extension ladders? ____ ____
9. Is general housekeeping up to OHM standards? ____ ____
10. Are ladders tied off? ____ ____

SITE SAFETY PLAN

1. Is a site safety plan available on site or accessible to all employees? ____ ____
2. Does the safety plan accurately reflect site conditions and tasks? ____ ____
3. Have potential hazards been described to employees on site? ____ ____
4. Is there a designated safety official on site? ____ ____
5. Have all employees signed the acknowledgement form? ____ ____

SITE POSTERS

1. Are the following documents posted in a prominent and accessible area?

   A. Minimum Wage ____ ____
   B. OSHA Health and Safety ____ ____
   C. Equal Employment Opportunity ____ ____

SITE CONTROL

1. Are work zones clearly defined? ____ ____
2. Are support trailers located to minimize exposure from a potential release? ____ ____
3. Are support trailers accessible for approach by emergency vehicles? ____ ____
4. Is the site properly secured during and after work hours? ____ ____

HEAVY EQUIPMENT (29 CFR 1926 Subpart O)

1. Is heavy equipment inspected as prescribed by the manufacturer? ____ ____
2. Is defective heavy equipment tagged and taken out of service? ____ ____
3. Are project roads and structures inspected for load capacities and proper clearances? ____ ____
4. Is heavy equipment shut down for fueling and maintenance? ____ ____
5. Are back-up alarms installed and working on equipment? ____ ____
6. Are designated operators only operating equipment? ____ ____
7. Are riders prohibited on heavy equipment? ____ ____
8. Are guards and safety appliances in place and used? ____ ____

EXCAVATION (29 CFR 1926 Subpart P)

1. Has a "competent person" been designated to supervise this excavation activity? ____ ____
2. Have utility companies been advised of excavation activities? ____ ____
3. Prior to opening excavations, are utilities located and marked? ____ ____

4. Has a professional engineer evaluated all excavations greater than 20 feet deep? ____ ____
5. Is there rescue equipment on-site and accessible to excavation? ____ ____
6. Is excavated material placed a minimum of 24 inches from the excavations? ____ ____
7. Are the sides of excavations sloped or shored to prevent caving in on employees? ____ ____
8. Has excavation greater than 4-feet deep been monitored for hazardous atmospheres (i.e. LEL/02 deficiency)? ____ ____
9. Are ladders used in excavations over 4-feet deep? ____ ____
10. Are ladders present every 25 feet? ____ ____
11. Are barriers, i.e. guardrails or fences placed around excavations near pedestrian or vehicle thoroughfares? ____ ____
12. Is excavation inspected daily by competent persons and documented? ____ ____

CONFINED SPACES (Proposed Regulation 29 CFR 1910.146)

1. Have employees been trained in the hazards of confined spaces? ____ ____
2. Are confined space permits available on project site? ____ ____
3. Is the contractors confined space safety procedure on the project? ____ ____
4. Has a rescue plan been established? ____ ____

PERSONNEL DECONTAMINATION

1. Are decontamination stations set up on site? ____ ____
2. Are waste receptacles available for contaminated clothing? ____ ____
3. Are steps taken to contain liquids used for decontamination? ____ ____
4. Have decontamination steps and procedures been covered by the site supervisor or safety official? ____ ____
5. Is all personal protective equipment and respiratory equipment being cleaned on a daily basis? ____ ____

EQUIPMENT DECONTAMINATION

1. Has equipment decontamination been established? ____ ____
2. Is contamination wash water properly contained and disposed of? ____ ____
3. Are all pieces of equipment inspected for proper decontamination before leaving the site? ____ ____
4. Is all equipment being cleaned on a daily basis? ____ ____

HAZARD COMMUNICATION (29 CFR 1926.59)

1. Is there a written program on-site? ____ ____
2. Is there a MSDS FOR EACH CHEMICAL present on-site? ____ ____
3. Are all containers properly labeled, as to content, hazard? ____ ____
4. Have employees been trained on chemical hazards? ____ ____
5. Are employee's trained on chemical hazards while doing non-routine tasks? ____ ____
6. Do employees (including subcontractors) know and understand the acute and chemical effects of exposure from the chemicals on-site? ____ ____
7. Have all subcontractors signed the Haz-Comm acknowledgement form? ____ ____

I have reviewed this inspection checklist with the safety inspector and fully understand the recommendation and will make every attempt to correct them immediately.

	Signature	**Date**
Site ~~Contractor~~ Supervisor:	______________________	______
Project Manager:	______________________	______
OHM Compliance Inspector:	______________________	______

EXHIBIT XII

ACCIDENT REPORTING/INVESTIGATION

OHM Corporation

ACCIDENT/INJURY/ILLNESS REPORTING PROCEDURES

OBJECTIVE

It is the objective of OHM Corporation to minimize accidents, to the fullest extent as practical through compliance with OSHA regulations and OHM Corporation Standard Operating Procedures (SOPs), as well as supervisor and employee safety training, site safety audits, and constant attention to safety. In the event of an accident involving injury, OHM will strive to obtain competent medical care for the injured employee. Following the accident/incident, a thorough investigation will be performed in an effort to determine and correct or eliminate the causative agent(s).

SCOPE

All employees of OHM Corporation.

PROCEDURE

The following procedures are minimum requirements for reporting all accidents/incidents. These procedures may be expanded upon, by the Regional Health and Safety Manager, to meet the specific needs in each region.

REPORTING OF INCIDENT: All accidents/injuries/illnesses, no matter how minor, are to be reported immediately by the employee to the employee's immediate supervisor/manager. Failure to timely report an injury/illness incident (within 24 hours of occurrence) may result in the Company disputing the injury/illness claim.

The Employee is responsible to report any accident, injury or illness, in which the employee is involved, to his/her immediate supervisor/manager. If the employee's immediate supervisor/manager is not available, the incident must be reported to the Division Manager or Worker's Compensation Handler at the employee's home division.

The Supervisor/Manager is responsible to see that the employee receives immediate first aid and/or prompt medical treatment should an injury/illness occur. It is the responsibility of the supervisor/manager to ensure that all accidents and injuries/illnesses are immediately investigated, reported and documented and distributed in a timely manner as outlined in these procedures.

The Regional Health and Safety Manager is responsible for notifying OSHA of any incidents involving a fatality or hospitalization of 5 or more employees.

OHM ACCIDENT/INJURY/ILLNESS REPORTING PROCEDURES

The Employee Accident/Injury/Illness Report must be completed for all accidents/incidents including but not limited to:

- Any work-related injury involving muscles and joints (strains/sprains)
- All work-related back injuries
- All work-related chemical exposures
- Any work-related injury/illness which involves first aid and/or medical treatment
- Any work-related accident that results in death of an employee
- Any incident that involves property damage but not necessarily employee injury.
- Any work-related incident (near miss) in which an injury could have occurred and that attention is needed to prevent similar incidents from occurring and preventing an injury accident

Stabilize the accident scene and job site. An accident site should not be disturbed until the investigation is completed. In severe cases, (lost time, serious injury), cordon off the area with caution tape. Consult with Regional Health and Safety personnel to determine if the initial accident investigation was sufficient and if photographs should be taken. All employees involved in the incident or response must remain at the jobsite until investigation interviews are completed.

The supervisor/manager must ensure that employees whose work related injuries required medical treatment (the employee was taken to a doctor, hospital, clinic, etc.) are not permitted to resume work without a written return to work statement from the treating physician. This statement should give diagnosis, prognosis, date of return to work and any work limitations. Should a statement such as "light duty" be given, call the treating physician to determine the exact restriction that is needed. (See Injury/Illness Status Report attached as Appendix B.)

DESIGNATE A HEALTH CARE PROVIDER: For cost containment reasons, the use of an emergency room facility should be limited to emergency situations whenever possible. Minor injuries and illnesses should be referred to private physicians and/or out patient clinics. Plans for the treatment of injuries/illnesses should be made well in advance of any incident. Arrangements should be made with a local health care provider to provide medical services to employees for work related injuries/illnesses. The name, address and phone number of this provider should be posted at all project sites and OHM offices.

OHM ACCIDENT/INJURY/ILLNESS REPORTING PROCEDURES

RESTRICTED WORK: Supervisory personnel must assume responsibility that the Company's policy on light duty is communicated to physicians and employees. (Restricted work policy statement should be posted at all jobsites and OHM offices.)

Restrictions given by the physician are to be followed. The supervisor shall contact the treating physician or the Corporate Occupational Health Supervisor, at Corporate Health and Safety in Findlay at extension 6064 should there be any question regarding an employee's ability to return to work.

When the jobsite is unable to accommodate restricted work activity, the site supervisor must coordinate transfer of the injured employee to his/her home division. The injured employee, upon return to his/her home division, must report to work upon arrival for job assignment and/or evaluation by the Company physician. Any deviation from this procedure must receive prior approval from the Corporate Occupational Health Supervisor.

MEDICAL BILLS/PRESCRIPTIONS: All bills and receipts (including medications) pertaining to work related injuries should be sent to the employee's home division to the attention of the person who handles worker's compensation claims. Do not use a cash advance for payment of any medical treatment or prescriptions unless there is no other alternative. The employee should obtain and submit a receipt when required to pay for injury related expenses.

I. ACCIDENTS WITHOUT INJURY OR ACCIDENTS CAUSING MINOR INJURIES REQUIRING JOB SITE ADMINISTERED FIRST AID ONLY

- Injured employee's supervisor/manager must complete an *Employee Accident/Injury/Illness Report* (Attached as Appendix A). The report must be completed, within 24 hours of an incident or knowledge of an incident, using the injured employee's own words to describe events and injury. The injured employee must sign the report. The supervisor/manager must ensure that the report is completely and accurately filled out and sign the report.

- Send all original reports, within 5 working days of the incident, to the division secretary handling worker's compensation for the injured employee. (Home Division) For Ohio employees only, send all original reports to Corporate Health and Safety. Original reports are to be retained in the employee's worker's compensation file.

- Fax or forward a copy of all reports to the Corporate Occupational Health Supervisor at Health and Safety in Findlay within 24 hours of the incident. (Fax: 419-425-6039)

- Retain a copy in job site safety file.

OHM ACCIDENT/INJURY/ILLNESS REPORTING PROCEDURES

II. ACCIDENTS CAUSING INJURY THAT REQUIRE MEDICAL TREATMENT OR RESULTS IN RESTRICTED WORK ACTIVITIES OR LOST TIME

- The *Injury/Illness Status Report* is to be completed whenever an injured/ill employee is evaluated or given treatment at a hospital, clinic, doctor's office, etc. The upper portion of this form is to be completed by the supervisor/manager or person sending the employee for treatment and the lower portion of the form is to be completed by the treating physician. The employee must return the original form to his supervisor/manager prior to returning to work or within 24 hours of a lost time incident.

- Injured employee's supervisor/manager must complete an *Employee Accident/Injury/Illness Report* (Attached as Appendix A). The report must be completed, within 24 hours of an incident or knowledge of an incident using the injured employee's own words to describe events and injury. The injured employee must sign the report. Supervisor/manager must ensure report is completely and accurately filled out and sign the report.

- Supervisor/manager must immediately investigate the accident and should obtain additional information as needed for complete investigation of the incident (photographs, diagrams, witness statements, doctor slips, etc.).

  The supervisor/manager must provide a written report, in memo format, detailing the accident/injury incident.

- Send all original reports, within 48 hours of the incident, to the division secretary handling worker's compensation for the injured employee. (Home Division) For Ohio employees only, send all original reports to Corporate Health and Safety. Original reports are to be retained in the employee's worker's compensation file.

- Fax or forward a copy of all reports to the Corporate Occupational Health Supervisor at Health and Safety in Findlay within 24 hours of the incident. (Fax: 419-425-6039).

- Retain a copy of all reports in job site safety file.

- The Division Manager must IMMEDIATELY notify the Regional Manager.
- The Regional Safety Manager must IMMEDIATELY notify the Vice President of Health an Safety, consult Corporate Legal Counsel and notify OSHA.
- The Regional Manager must IMMEDIATELY notify the President and Chief Executive Officer of the Corporation.
- A complete investigation of the incident will be conducted by the Vice President of Health and Safety and/or his appointed designee(s).

OHM ACCIDENT/INJURY/ILLNESS REPORTING PROCEDURES

FORMS

OHM EMPLOYEE ACCIDENT/INJURY/ILLNESS REPORT: *(Form 0084)(Appendix A)*

This form must be completed for all accidents and signed by the employee, supervisor/manager and safety official. The supervisor/manager must complete and sign the report following a complete investigation of the incident. This reports should be completed using the employee's "own words" to describe the details of events involved in the incident. The employee must sign the report unless medically unable to do so.

This report meets the requirements of the OSHA Form No. 101 and provides necessary information for completion of a first report of injury for worker's compensation claim. Forms may be obtained through Corporate Health & Safety.

INJURY/ILLNESS STATUS REPORT: *(Form 0085)(Appendix B)*

This report must be completed at the time of each medical evaluation relating to an injury/illness. Information provided on this report is necessary to determine the employee's ability to work, if the incident is OSHA recordable and for the administration of worker's compensation claims.

This report also serves as an authorization to release medical information which is required to obtain doctor's reports, emergency room records, x-ray reports, lab reports, etc., pertaining to the work-related incident. The medical release must be signed by the employee.

The upper portion of this report is to be completed by the supervisor/manager or person sending the employee for treatment and the lower portion of the form is to be completed and signed by the treating physician. The white copy of the report must be given to the employee or the immediate supervisor, the treating physician/agency retains the yellow copy. Forms may be obtained through Corporate Health & Safety.

NOTICE OF LOST TIME INJURY/DEATH: *(Appendix C)*

This report is required to be completed in any accident/injury case in which lost time or death is involved. The notice must be completed by the Division Manager and presented to Corporate Health and Safety within 24 hours of the incident. Forms may be obtained through Corporate Health & Safety.

WITNESS FORM *(Appendix D)*

This form is to be used to obtain a signed statement from individuals who have witnessed the injury/incident or have pertinent information relating to the incident. Forms may be obtained through Corporate Health & Safety.

OHM Corporation

POSITION STATEMENT ON MODIFIED WORK

It is the objective of OHM Corporation to minimize accidents to the fullest extent as practical through strict compliance with OSHA regulations and OHM Corporation Standard Operating Procedures (SOPs), as well as supervisor and employee safety training, site safety audits, and constant attention to safety. Should an employee have the misfortune of being injured or becoming ill in the course of, and arising from his/her employment, OHM Corporation will endeavor to provide an injured employee an alternate, temporary assignment when the employee can return to work with a restriction. Modified (Light Duty) work will be made available in order to bring the injured employee back to the work environment, for the benefit of the employee and the Company, whenever medically appropriate.

Employees are expected to return to modified work when medically capable. The work assigned the injured employee will be work that will not aggravate the medical condition and meets the restrictions set forth by the treating and/or Company physician. Examples of modified work include, but are not limited to, office work, dispatching, and light shop work.

Employees accepting modified work will be paid the rate of pay they were earning immediately prior to the period of disability and are subject to evaluation by the Company physician, at the Company's discretion.

OHM Corporation

ACCIDENT/INJURY/ILLNESS REPORT FORM

Form 0084
H & S Dept.
6/91

☐ Accident ☐ Injury ☐ Illness
Property Damage ☐ Yes ☐ No
Vehicle Involved ☐ Yes ☐ No

Health & Safety Use Only

Case # ____________
☐ First Aid Only
☐ Medical Treatment
☐ Lost Workdays – Restricted Activity
☐ Lost Workdays – Away from Work
☐ Fatality

Exact Date and Time of Incident ____________ ____ a.m. ____ p.m. Shift ☐ 1st ☐ 2nd ☐ 3rd

OHM CORPORATION ____________
(Employee's Home Division/Regional Office/Subsidiary)

Address ____________
City State

PROJECT IDENTIFICATION (Project Related Incidents Only)

Project No. ____________ Project Start Date ____________ Completion Date ____________

Location (Full Address) ____________

Telephone ____________ Project Manager ____________

EMPLOYEE INFORMATION

Employee's Full Name ____________ Employee No. ____________

☐ Regular Full Time ☐ Regular Part Time ☐ Temporary ☐ Non-Employee

ne Address ____________

Date of Birth ____________ Age ____ Social Security No. ____-____-____ Sex ☐ M ☐ F

Job Title ____________ Department ____________ Date Hired ____________

Length of Employment ☐ In Training. ☐ ____ Mos. ☐ ____ Yrs. Time in Job Class ☐ In Training. ☐ ____ Mos. ☐ ____ Yrs.

Name of Employee's Direct Supervisor ____________

Supervision at Time of Accident ☐ Directly Supervised ☐ Indirectly Supervised ☐ Not Supervised

Specific Location Where Incident Occurred ____________

____________ ☐ OHM Facility ☐ Project Site ☐ Other ____________

To Whom Was Incident Reported? ____________ When? ____________

Witness Name/Address ____________

Witness Job Title/Reason in Area ____________

Describe Employee's Job Duties Being Performed When Injured ____________

____

____

escribe Fully the Events Which Resulted in the Accident/Injury/Illness ____________

____

____

PLEASE CONTINUE ON BACK OF THIS FORM

(Use Extra Page If Needed)

Describe the Injury/Illness in Detail; Indicate Part of Body Affected

Name of Object/Substance Which Directly Injured Employee

Has/Will Employee Seek Treatment? ☐ Yes ☐ No Did Employee Die? ☐ Yes ☐ No

Name/Address of Hospital/Doctor

Describe Treatment Given

Was Employee Able To Return To Work? ☐ Yes ☐ No

If YES: ☐ Regular Work ☐ Work with Restricted Activities

Restriction

If NO: Date Lost Time Began Date/Est. Date To Return

Identify Personal Protective Equipment Used by Injured Employee

What Training or Instruction Had Been Given?

How Could This Accident Have Been Prevented?

Corrective Action

Are You Reporting This Incident as an Industrial Injury/Illness? ☐ Yes ☐ No

Signature (Employee) Date

Signature (Supvr/Manager) Date

Signature (Safety Officer) Date

Signature (Proj. Manager) Date

Signing This Report does Not Constitute Certification of an Industrial Claim

DISTRIBUTION Original To: Division Secretary at Employee's Home Office

Copy To: ☐ Corporate Health & Safety ☐ Regional Health & Safety Manager ☐ Project Manager ☐ Site Safety File

OHM Corporation

Form 0085
H & S Dept.
6/91

INJURY/ILLNESS STATUS REPORT

Employee ______________________ Social Security No. ____-____-____

Home Address ______________________ Phone ____________

Job Title ______________________ Home Division ______________________

Date/Time of Injury/Illness ______________ ____ a.m. ____ p.m. Location: ☐ OHM Facility ☐ Project Site ☐ Other ____________

Description of Injury/Illness ______________________________________

AUTHORIZATION TO RELEASE INFORMATION

I hereby authorize all physicians, hospitals, clinics and all persons to discuss with, and release to OHM Corporation and its authorized agents, any information or copies thereof acquired in the course of my examination or treatment for the injury identified above. This authorization shall not extend to any other medical condition, past or present, unless the same is causally or historically relevant or related to the injury referred to above.

Employee Signature ______________________ Date ____________

PHYSICIANS OR MEDICAL PERSONNEL TO COMPLETE REMAINDER OF FORM

WORK STATUS

☐ Patient may return to work with no limitations

____
Date

☐ Patient may return to work on ____________ (Date) with limitations indicated. These restrictions are in effect until ____________ (Date) or until Reevaluation on ____________ (Date)

Patient may work ______ hours in a work day.

☐ Patient is totally incapacitated at this time. Patient will be reevaluated on ____________ (Date)

DEGREE

☐ Sedentary Work. Lifting 10 pounds maximum and occasionally lifting and/or carrying such articles as dockets, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required only occasionally and other sedentary criteria are met.

☐ Light Work. Lifting 20 pounds maximum with frequent lifting and/or carrying of objects weighing up to 10 pounds. Even though the weight lifted may be only a negligible amount, a job is in this category when it requires walking or standing to a significant degree or when it involves sitting most of the time with a degree of pushing and pulling of arm and/or leg controls.

☐ Medium Work. Lifting 50 pounds maximum with frequent lifting and/or carrying of objects weighing up to 25 pounds.

☐ Heavy Work. Lifting 100 pounds maximum with frequent lifting and/or carrying of objects weighing up to 50 pounds.

☐ Very Heavy Work. Lifting objects in excess of 100 pounds with frequent lifting and/or carrying of objects weighing 50 pounds or more.

LIMITATIONS

1. The patient may:
   a. Stand/walk
      ☐ None ☐ 1-4 hours
      ☐ 4-6 hours ☐ 6-8 hours
   b. Sit
      ☐ 1-3 hours ☐ 3-5 hours
      ☐ 5-8 hours
   c. Drive
      ☐ 1-3 hours ☐ 3-5 hours
      ☐ 5-8 hours
2. Patient may use hands for repetitive:
   ☐ Single grasping ☐ Pushing & pulling
   ☐ Fine manipulation
3. Patient may use feet for repetitive movement as in operating foot controls:
   ☐ Yes ☐ No
4. Patient is able to:

	Frequently	Occasionally	Not at All
a. Bend	☐	☐	☐
b. Squat	☐	☐	☐
c. Climb	☐	☐	☐

PHYSICIANS REPORT

Diagnosis ______________________

Prognosis ______________________

Other ______________________

____

☐ Referred to company physician
☐ Patient referred/admitted:

To Whom ____________

Address ____________

Phone ____________

Date ________ Time ________

Date of this Report ____________ Physician's Signature ______________________

Address ______________________ Phone ____________

White - OHM
Canary - Clinic Copy

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OHM Corporation

NOTICE OF LOST TIME INJURY/DEATH

Please Type or Print

Employee's Name: ______________________________

Employee's No.: ______________

Location: ______________________________

Supervisor's Name: ______________________________

Date of Injury/Death: ____________________ Time: __________

Brief Description of Incident: ______________________________

____

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Immediate Corrective Action: ______________________________

____

____

Tentative Follow-up Corrective Action: ______________________________

____

Signature: ______________________________ Supervisor Manager

Date: ______________

Distribution

- Fax to the following:

  1) Fred Halvorsen, Vice President, Health and Safety
     Fax (419) 425-6039; Phone (419) 424-4910

  2) Regional Manager

- Original: Corporate Health and Safety

- Copy: Site Safety File

WITNESS FORM

NAME ______________________________ AGE __________

ADDRESS ____

PHONE ________________ MARITAL STATUS ________________

OCCUPATION ____

DATE ACCIDENT WITNESSED ____________________ TIME __________

LOCATION OF ACCIDENT ________________________________

MY POSITION AT TIME OF ACCIDENT ______________________

MY LOCATION AT TIME OF ACCIDENT ______________________

____

NARRATIVE REPORT

Describe in your own words what happened. (What did you see, hear, smell, do, etc.):

____

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____

____

____

____

____

I have read the above report and it is true and correct to the best of my knowledge. I do not recall any other facts of this accident.

______________________________   ____/____/____

(Signature of witness)   (date)

EXHIBIT XIII

OSHA POSTER

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29,Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA	(404) 347-3573
Boston, MA	(617) 565-7164
Chicago, IL	(312) 353-2220
Dallas, TX	(214) 767-4731
Denver, CO	(303) 844-3061
Kansas City, MO	(816) 426-5861
New York, NY	(212) 337-2378
Philadelphia, PA	(215) 596-1201
San Francisco, CA	(415) 744-6670
Seattle,WA	(206) 442-5930

Lynn Martin

Lynn Martin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

Washington, DC
1992 (Reprinted)
OSHA 2203

To report suspected fire hazards, imminent danger safety and health hazards in the workplace, or other job safety and health emergencies, such as toxic waste in the workplace, call OSHA's 24-hour hotline: 1-800-321-OSHA.

This information will be made available to sensory impaired individuals upon request. Voice phone: (202) 523-8615; TDD message referral phone: 1-800-326-2577

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CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

COMMENTS BY SCOTT MARQUESS

Section	Item Number	Corps Comments	OHM's Response	Comment Action
General	1	Please identify to EPA any modifications which are planned for this removal action work plan which resulted from your January 14, 1994, review meeting.	Refer to Corps of Engineers Engineering Review Comments (22 sheets) made during the January 14, 1994, Review Meeting, including OHM response to the comments and actions noted. These comment sheets are included in the Final Work Plan.	A
General	2	A detailed community relations plan should be developed to assure that local residents potentially affected by the removal actions at each of the sites are aware of the Army's activities. This is especially true for the Colyer Manor site, which is located in the midst of Army family housing. The Army may need to exercise special care during construction activities at the Colyer Manor site due to the proximity of residents and small children.	It was decided at the January 14, Review Meeting that Fort Riley would directly handle public relations activities; OHM agreed to participate in and assist as directed in such activities. At the review meeting, the need for temporary fencing at Colyer Manor to protect the public from hazards at the site was discussed. Temporary fencing at Colyer Manor was added to the work plan as a requirement at Colyer Manor. Configuration of the fencing was TBD in the field during site preparations.	A
General	3	Please clarify the procedures you intend to utilize to calibrate the XRF for evaluating soil lead levels in confirmatory analyses at Colyer Manor. We have found poor correlation between XRF and laboratory analyses. A statistically acceptable correlation must be established between field screening methodologies and standard laboratory methods to assure that the extent of soil contamination has been defined and that the excavation has met clean-up levels.	Subsequent to the January 14, 1994, Review Meeting it was decided that XRF would not be of greater benefit to the project than standard laboratory methods. It was decided to not use XRF screening and instead use standard laboratory methods for all analyses at Colyer Manor, including investigative and confirmatory analyses. The Final CSAP reflects this decision.	A

CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

COMMENTS BY SCOTT MARQUESS

Section	Item Number	Corps Comments	OHM's Response	Comment Action
General	4	Please clarify your methods for determining background levels of arsenic relative to the Pesticide Storage Facility (PSF).	It was decided at the January 14, 1994, Review Meeting that background for arsenic would be determined through sampling at locations to be determined in the field by USACE representatives (K. Birkett and M. Green) in areas of similar geology. The Final CSAP contemplated 19 samples to be taken. Arsenic levels in the background will be determined by USEPA Methods 3050 and 7061. See the Final CSAP Table 4.1 and Section 7.1.3.	A
General	5	The work plan states on page 3-5 that the pesticides found at the PSF "...are the sole active ingredients of the stored materials, and as such, meet the listed criteria per 40 CFR 261.33 as discarded commercial product spill residue...". RCRA Land Disposal Restrictions (LDRs) associated with these listed hazardous wastes must therefore be met prior to disposal. The document should provide information illustrating how the Army intends to comply with the LDRs.	The initial assumption that the pesticides at the PSF are the "sole active ingredients of the stored materials, and as such must meet the listed criteria as discarded commercial product spill residue" was incorrect. The generator stated in a letter addressed to USACE, dated January 28, 1994, that "We have no records/knowledge of documented spills of pure products in this area." Because the source of contamination is unknown, the materials or residues are not a listed waste. The waste from the PSF will be classified utilizing 40 CFR 261 subpart C criteria for characteristically hazardous waste. OHM will ensure that the Treatment Facility that is utilized corresponds with all applicable regulations regarding the treatment and disposal of the waste.	A

CORPS OF ENGINEERS ENGINEERING REVIEW COMMENTS

COMMENTS BY JOE SHIELDS - TECHNICAL MANAGER

Section	Item Number	Corps Comments	OHM's Response	Comment Action
General	1	I will attempt to include in the comments below verbal comments and agreements made during this January 14, 1994 Work Plan meeting held at the Kansas City Corps of Engineers District Office, excluding written comments by Kevin Birkett, which are attached. Please bring to my attention any questions, comments, inconsistencies.		
1.1.2 Sampling Plan	2	PAH's are not being remediated at the PSF; therefore, please delete references to PAH's in text and delete any testing for PAH's. As PAH's have been identified at site, they should be addressed in Safety Plan.	All references have been deleted.	A
1.1.2	3	Refer to area to be remediated at the pesticide storage facility as the DEH yard. Building 348 is planned to be closed through a separate action.	Done	A
1.2.1	4	Refer to prior documents investigating this site.		A
General	5	Site maps provided do not provide enough detail. Should be able to get to specific sites using work plan.		A

2.2	6	Discuss what permits are required. Those identified at WP meeting are: 1. Digging permit from Fort Riley 2. NRC permit for use of XRF 3. Electrical permits Discuss who, what, how, etc. for each permit.	XRF will not be used.	A
2.3	7	Provide additional discussion of erosion control. Need to re-establish vegetation.		A
2.3 Paragraph 2	8	Moving equipment to staging location at the end of each day is unnecessary.		A
2.4.1	9	Cleanup level at Colyer Manor is 500 mg/kg.	See Exhibit II.	A
2.4.2	10	Include a round of investigative sampling at PSF. For area of arsenic contamination, use XRF, and similar sampling grid as required for Colyer Manor (see Comment 6, Kevin Birkett). For pesticide contamination, use existing data and propose locations of additional samples for investigation.	XRF will not be used. See Final CSAP submitted.	W
2.4.2	11	Include rationale for collecting confirmatory samples on a 20-foot grid.		W
2.4.3	12	Delete sampling of backfill and source water. Both will be provided by Fort Riley.		A
2.5	13	Base initial excavation of XRF sampling.		W
2.5 and 2.6	14	Excavation at each site shall be to a maximum of 5 feet below ground surface.		A
2.6	15	Near the building, excavate to the top of spread footing, then use 1:1 cut slope. See below.		A
2.6	16	State in plan that there will be no excavation below existing pavement or buildings at PSF.		A

3.2	17	Add bullet stating Fort Riley will prepare a community relations plan for activities included in this WP, under a separate cover.		A
3.3.1	18	Delete "visual" in 4th bullet.		A
3.4.2 Last paragraph	19	"avoiding"...poor choice of word. State Fort Riley will provide OHM information on how they are classifying their waste as the generator.		W
5.0	20	The on-site chemist and site safety and health officer are professional, salaried employees. Please include their resumes.	No on-site chemist	W
Appendix A Table 3.2, Section 3.1	21	Instead of referring to Section 7, refer to specific tables in Section 7.		W
Appendix A Section 4.1.2 1st bullet	22	Pre-characterization samples should be taken from all contaminated areas, not just those 0 to 1 foot deep		A
Appendix A Section 4.1.2 3rd bullet	23	Instead of saying "two confirmation samples," state "Discrete samples".		W
Table 4.1	24	Provide figures showing sampling location.		A
Section 2.7.1	25	At Colyer Manor, remove temporary haul road, place gravel in excavation, and place 2 feet of backfill cover.	First SOW specifies 1-foot minimum backfill and 6-inch topsoil. See Appendix J.	E
COMMENTS BY KEVIN BIRKETT - CON REPRESENTATIVE				
2.3	1	Set up on-site office and equipment staging area at COE Resident office. Location is less than 1/2 mile from PSF. Location was shown on map to OHM PM, Phil Connor.		A

2.3	2	Equipment may be left overnight in the PSF yard (known on base as the DEH yard). At Colyer Manor, construct temporary fencing for equipment staging and decon area. Use 6-foot fencing.		A
2.3	3	Use steam cleaner rather than high-pressure washer to minimize decon water to be disposed.		A
2.3	4	Place geotextile under gravel for temporary haul road.		A
Figure 2.1	5	Scrap proposed decon pad and build on site using 30 mil HDPE, geotextiles, and a sand base.		A
2.4	6	Use 12-foot sampling grid to determine initial excavation limits. Sample at 6 inches, 16 inches, 36 inches at all locations and also at 5 feet where previous investigations have shown contamination at this depth. Analyze on-site with XRF. Once limits for excavation defined, sample at 6-foot intervals to define edge of excavation.	After discussing in a meeting on January 14, 1994, in Kansas City, OHM was requested to recommend a sampling plan that would optimize sampling and analytical costs and determine initial limits of excavation. After further discussion, first SOW set forth the sampling and analytical requirements. XRF was deleted during conversation between J. Shields and P. Connor 11/25/94.	W
2.6	7	Hand excavation only within 2 feet of utilities unless utility is exposed. Fort Riley will mark utilities in the field.		A
2.6	8	Do not abandon monitoring well, excavate around.		A
2.6	9	Discuss moving fence around DEH yard. Map provided to OHM PM Phil Connor showing what portion of fence is to be removed and where temporary fence is to be installed. Temporary fence is to be 6 feet with silt fencing and hay bales 3 feet inside of temporary fence to prevent erosion.		A

2.7.2	10	Define suitable materials here or reference specific section in SOW and include SOW as appendix to document.		A
2.7.2	11	Use cohesionless backfill around utilities (within 1 foot).		A
2.7.2	12	Seeding subcontractor will be required to establish turf, not just reseed.		A
2.8	13	Word "circulations" should be "calculations."		A
2.8	14	Delete cost data.		A
3.1.1	15	Also copy furnish Fort Riley (Janet Wade) with all submittals for review.		A
3.2	16	Notify Fort Riley Radiation Protection Office 10 days prior to mobilizing XRF. P.O.C. Mike Walter (713) 239-2424.	XRF will not be used.	W
3.3.2	17	Consider using excavation equipment with longer reach to assure dump trucks do not have to enter exclusion zone (thereby eliminating the need to decon their tires) and assure that all excavation at PSF will be able to be accomplished from the top of the ravine.		A
Table 3.1	18	Keep units consistent (ppm vs mg/kg)	Inconsistent units are appropriate for activities described i.e. TCLP results/ regulatory levels are described as mg/L, and the Table 3.2 has been changed to reflect these units, LDR Limits are expressed as mg/kg total concentration.	E
Page 3-13	19	Procedure should also be used for wastes that are "non-haz" or "special".		A
Appendix A 2.1	20	For each key member of organization, list office address and phone number.	Will comply	A

Appendix A 6.1	21	Jars, packing, and cooler to be provided by lab.		E
Appendix A 6.1	22	Samples for laboratory analysis can be kept on-site for a maximum of 24 hours.		A
Appendix A 6.1	23	Liquid samples must have "this side up" stickers.	Section 6.1 addresses this comment.	A
COMMENTS BY JIM WOOLCOTT - I.H.				
Work Plan 3.4.1	1	The total lead cleanup level is stated here as 500 mg/kg. However, in Section 2.4.1 (pg. 2-4) it is listed as 400 mg/kg. Which is correct?	See Exhibit II of Final Work Plan	W
Table 3.1	2	Withdrawn by USACE.		W
SSHP 1.1	3	It is stated here that PAHs are present at the PSF site. I found no further discussion of this group of contaminants elsewhere in this document. If PAHs are known to be present, please include pertinent information in Section 3.1, and elsewhere as appropriate. If not, please delete reference here.		A
1.4 second bullet	4	Change 1910.120(e) reference to 1926.65(e).		A
3.1.2	5	The OSHA-PEL for Dieldrin is incorrect - the correct PEL is 0.025 mg/kg (skin). Also, this may influence the sampling method described in the Air Sampling Plan, Section 7.0, Analytical Procedures, page 7-1 (the lowest concentration range of detection of organochlorine pesticides is given as 0.1 mg/m^3).		A
General 12.1	6	Change 1910.120(f) to 1926.65(f).		A
Air Sampling Plan, Table 4.2	7	Same comment as #5.		A

COMMENTS BY AUTHOR UNKNOWN				
		PSF - will not remediate PAHs		A
Draft Work Plan Page 3-13		Discuss non-hazardous soils disposal	Procedure will also be used for wastes that are confirmed to be non-hazardous or special wastes (Kevin Burkett comments 1/17/94, Item 19]. All submittals to USACE will be copied to Fort Riley (Attn: Janet Wade) for concurrent review. [Kevin Burkett comments 1/17/94, Item 15].	A
		Surface water diversion; erosion control - address in plan		A
		Waste-type determination		A
		No excavation under Bldg. 348 No excavation under paving (regulators may argue with this)		A
		Site Visit/Meeting, FR asked that Colyer and PSF portions of plan be separate	Did not understand or agree to this.	E
		At minimum, append scope. Prefer scope provisions be incorporated into the work plans.		A
		Site restoration - grading plans - provide more information - stress drainage and erosion prevention.		A
		Colyer Max 5 feet below existing grade - 2 feet cover soils		A
		Background for arsenic for PSF - Sample locations TBD prior to/during field sampling by KB and Mike Green - in areas of similar geology - i.e., terrace deposits		A
		Provide figures with sampling grids		A
		Fencing at both sides		A

1.0		Refer to EE/CA, S-R lead sites DSEEM and Action (by doing so, this plan does not require detail re: backgrd. memos.		A
Figure 1.1		Add Colyer Manor Site, correct/label I-70 etc. In addition to Figures 1.1, 1.2, and 1.3, add "intermediate scale" figures. showing site locations.		A
		Add North/direction arrows to Figure 1.2 and 1.3.	OHM does not presently have reference information to properly orient map.	E
1.1.2		Areas to be excavated (per Figure 1.3) is not limited to the area "east" of Bldg. 348. Delete PAHs from list as these are not to be remediated. Also, area to be excavated (within fence) is not generally flat". See later comments re: "area to be remediated.: Site is not the bldg., but area around it. Revise history.		A
2.2		Provide specifics re: permits and licenses		A
2.3		Discuss site ops (command post/office) center location. CH landfill location doesn't seem practical since we're not doing.		A
		Are arrangements made re: use of scale, etc.? (if needed)?	CH landfill will not be used as site ops center. Now DEH area will be used.	W
		Security is not likely to be a significant problem. Reconsider need to move equipment at night. No need to move from PSF since it is fenced.		A
		Delineate exclusion zones now - include on figures.	Will delineate after initial limits of excavation are established.	E
		Show location of temporary road at Colyer on a figure.	Will show after precharacterization task is complete.	

Figure 1.3, etc.		Revise excavation area per discussions.		A
2.4.1		XRF - what is "accuracy" of XRF equip/procedures proposed? Will a higher number have to be used to provide sufficient confidence? Cleanup level is 500 ppm, not 400. See action memo.		W
2.4.2		Refer to EE/CA, not Draft R (which isn't a public document).		W
		What is rationale/basis for 20-foot grid?		W
2.4.3		"Source water" - data exists for FR wells. Is non-chlorinated water needed? Or potable?		D
		For backfill, check if CE has tested Campbell Hill borrow soils. What type of "certification" is needed? FR will ID an acceptable borrow area. (Begin each PSF 2 Colyer sections on a new page, so plans can be separated).		A
2.5		Discuss 1-foot initial depth. Does data warrant this or greater initial depth?		W
COMMENTS BY MICHAEL GREENE - ED-GH				
Work Plan	1	There are numerous misspellings and missing small words (to, of, the, etc.) throughout this document that should be corrected.		A

	2	The overall plan for this scope of work requires "site restoration" following the removal actions. There is nothing detailed in this plan as to the specifications for this work other than some general language concerning "compaction of loose lift layers" and "match existing", and "according to, Fort Riley specifications." There should be language in this work plan to cover site restoration in some detail and for some form of prework survey to provide a baseline to evaluate post completion conditions. The detail for the subcontractor to reseed should also include ecologic conditions for this particular area and a requirement for successfully establishing vegetation.		A
Page 2-6 1st paragraph	3	What is "tarped?" Correct this statement.	Tarped means covered with a tarpaulin.	A
Page 3-3	4	When and where is the preconstruction meeting to take place?	TBD by USACE.	
Page 3-4	5	Who are Phil Connor and Robert F. Smart and what is their relationship to this project and who sent the referenced January 3, 1993, letter? Was this letter actually revised in 1993 before the draft scope of work which was dated December 17, 1993? Correct these dates.	See Exhibit II in Final Work Plan.	
Appendix A Table 4.1	6	This plan should show where the background samples will be taken and provide the rationale for using that particular location.	Comments are irrelevant due to change in SOW.	
Appendix A 4.2.1	7	Has not the area of contamination already been determined by previous sampling? How much more needs to be done? Provide specific numbers and rationale for additional sampling.	Comments are irrelevant due to change in SOW.	
Appendix A 4.2.2	8	How many confirmation samples will be taken. Provide specific numbers and rationale.	Comments are irrelevant due to change in SOW.	

Appendix A 4.3.2	9	What is the regional background level for arsenic and how does it compare to what has been found so far?	Comments are irrelevant due to change in SOW.	W
		What will be the strategy for cleanup if the sampling for background reveals that arsenic levels are zero or below detection limits and how much cost will be involved in trying to clean up to nondetect levels?	Comments are irrelevant due to change in SOW.	W
Appendix A 4.4.1	10	Where is the backfill material to be obtained?	Comments are irrelevant due to change in SOW.	W
Appendix A 9.2.2	11	All nondisposable sampling equipment "shall" be precleaned and/or decontaminated.	Section 9.0 addresses this comment.	
	12	In a letter dated December 8, 1993, to CEMRO-ED-ER/Shields, Section 2.0 stated that "monitoring wells on the site will be closed by USACE prior to excavation." This may not be the case now. These wells may need to be retained to continue groundwater evaluations and this may impact the work to be done in this plan from an access standpoint. Planning for this contingency needs to be outlined in this work plan.	Wells will be retained in use and not closed.	A
	13	Also attached to the letter to CEMRO-ED-ER/Shields is a memo on Site Restoration, Backfilling; which has some very specific language for site restoration. This specification should be included as a part of this work plan.		A
COMMENTS BY AUTHOR UNKNOWN				
Draft Work Plan General	1	Colyer Manor is misspelled throughout the document.	Corrections made.	
Figure 1.1	2	Camp Funston is misspelled on location map.	Corrections made.	

Figure 1.2	3	A scale and north arrow should be included as points of reference.	Arrows have been added where information was available to orient map.	
	4	Placing spot heights (elevation) along boundary of, or throughout, the "anticipated area to be removed" would help delineate the soil to be removed.		E
Figure 1.3	5	A scale, north arrow should be included; contour lines would be useful.	Arrows have been added where information was available to orient map.	
Final Project Report 2.8	6	Could "Final Project Report" also include a section titled "Methodology" with regard to the actual procedures for removing the soils at Colyer Manor, or will this be defined in "Scope of Work Narrative"?	Will be defined in "Scope of Work Narrative."	
Technical Approach 3.0 (3.4.2, 3.4.3)	7	The numerous CRF regs sited, here and throughout the document, could be listed as a reference/exhibit at the end of an appendices for the readers benefit, similar to "Material Safety Data Sheets Collection" in Exhibit III. 40 CFR 261.32 & .33 40 CFR 300.440 40 CFR 268 Site Specific Health and Safety - 1.2 Regulatory Requirements 29 CFR 1910.120 29 CFR 1926.65		A
Preconstruction Activities 3.2	8	No specific community relations plan is listed in this section (or defined in a separate section) to address concerns of residents or others in close proximity to the remediation sites.	Fort Riley to perform community relations.	
Decon Wastes Generated 9.3	9	With reference to "collected in 55 gallon closed-head drums staged accordingly and disposed in accordance to all applicable State of Kansas and federal regulations", shouldn't those regs be specified?	Will specify.	

Appendix B Site Specific Health/Safety Plan Applicable to CM & PSF	10	Should a well defined community relations plan be included in this section? Hazard Communication (3-4, Section 3.1.4) only addresses communications with employees and workers at sites.	Fort Riley will perform community relations.	
	11	What method will be used to collect contaminated water generated by workers for washing, etc? (Same as decon pad described in Section 2.3?)		
	12	Will ALL contaminated waste water be used to spray down haul trucks (from decon pad only)? Are haul trucks water-tight?	No, some water may remain. It would then be properly transported and treated.	
	13	If it is not necessary to use collected, contaminated water as spray to "hold down dust", how will it be stored and disposed of?	Stored in 250-gallon poly tank. See above.	
	14	In the event of an early spring thaw or excessive rains, what plans have been designed to prevent excessive runoff of contaminated soils from PSF and Colyer Manor sites (trench around perimeter of contaminated soils)?	Erosion control measures are described in Final Work Plan.	
COMMENTS FROM MARY WICHMAN - CEMRO-ED-EG				
1.1.2	1	The arsenic contamination is a small isolated area of the Pesticide Storage Area. Rewrite the text to reflect this. Arsenic will not be analyzed for throughout the site, it will only be looked at in the area of concern.		A
Figures 1.1 and 1.2	2	Add the scale.		A
2.4.4	3	Correct the text. The samples will be collected on a twenty-foot grid.		
2.6	4	Note the prescribed action levels.		A

2.8	5	The final report shall include the analytical results (the complete package) from the laboratory and a discussion of those results - how can you determine if you have met the objective of the project without discussing the analytical results for the confirmation samples?		A
3.1.1	6	Add to the text. The USACE requires the data package (including all the QA/QC to be submitted to the MRD Laboratory (through the Project Chemist). This package will include the certificates of analysis and all the batch QA/QC as well as a table noting the MRD split samples corresponding sample identification. The package will be submitted for the confirmation samples only.		
3.4.2	7	Correct the text. The arsenic contamination is located near SB-10.		A
Table 3.1	8	Where did these cleanup levels come from? The source should be noted in the text.		A
3.4.4	9	Why does the T&D Coordinator need to supervise the samplers? The samplers should be trained and qualified to collect samples and follow a CSAP.		A
3.4.4 Last paragraph	10	Why? The paragraph says nothing. Give a phone number, or define what is in place.		
3.4.5	11	Analysis will determine if the waste is characteristically hazardous. Fort Riley has been informed that a letter is required noting that the U and P codes do not apply. At the site visit, OHM personnel received a copy of the letter from Region VII EPA defining the waste assessment. This letter should also be referenced in this section and included as an appendix.	Per phone conference on January 27, 1994 with USACE (Shields) Fort Riley (Wade) and OHM (Connor, Tidwell, Kinder) Fort Riley will provide a news letter to settle the issue regarding acceptance of wastes by disposal facilities.	

3.4.6	12	A new section - interesting. The scope, goal, plan, and impact sections need a little work. Figure 3.3 should include the Fort Crook connection in the USACE review process. CERCLA status should be included in verifying vendors pricing, etc.		A
5.0	13	The Manager of Technical Field Services and the Quality Assurance Officer should be one person. Manager of Technical Field Services - interesting. Project Engineer - interesting. The T&D Coordinator and the Regulatory Specialist should be one person. The SOW specifically requested a qualified individual (chemist) for this project, yet no one was named.	Chemist will not be required in field with detection of XRF. OHM Home Office Organization has MTFS and QAO, T&D Coordinator, Reg Spec. as separate persons.	E
CSAP General	14	This document is poorly organized. It is very wordy and redundant. A number of specific requirements from the SOW are not included; this leads me to believe that the SOW was not read prior to the preparation of this document. OHM will be held, contractually, to the SOW requirements. Please read the SOW prior to the second submittal of this document.	OHM has reread the SOW and understands the contractual requirements of the SOW.	A

General	15	The number of comments reflects the poor quality of the document. Due to the time schedule for this project, the field team will likely be on-site prior to the final issuance of this document. This generally has not been a problem with the Walnut Creek office because only minor changes were required for the draft to final versions. This document, however, requires significant changes to meet the SOW requirements. The November 11, 1993, letter to Terry Sole discussed the technical writing problems and suggested an evaluation of the USACE approved documents to assist in the preparation of future documents. Please heed these suggestions.	OHM has heeded the suggestion and perused the USACE-approved documents to assist in the preparation of this document.	A
Figure 1.1	16	Add the location of the Colyer Manor site.	The Colyer Manor site location has been designated on Figure 1.1	A
2.1.4 and 2.1.5	17	A number of these responsibilities are carried out primarily in the field. For example, the COCs should be reviewed in the field before they go to the lab incorrectly. Some of the tasks do need to be performed on a secondary basis off-site. However, the responsibilities of the QA Officer and the manager should be combined. A number of these responsibilities should be re-evaluated - they are not appropriate for this work effort (auditing program?, primary standards?, procedures updates?, committee?).	All documentation will be reviewed for completion before samples are shipped offsite. The responsibilities for the QA Officer and Manager have been combined. The responsibilities have been re-evaluated. The auditing program ensures that all laboratories are following the proper analytical procedures.	A
2.1.6	18	The SOW specifically required a qualified person, preferably a chemist, to be assigned to this project. Trip blanks and equipment blanks are not required for this work effort. Delete this reference. Add to the on-site person's responsibilities laboratory coordination and QA/QC in the field.	The OSR has decided not to use a chemist. The trip and equipment blanks have been deleted.	A

2.3	19	During the site visit, which OHM attended, the use of a local laboratory was discussed for the XRF calibration samples. Due to the unavailability of an XRF it is even more prudent to pursue quick turns at a local laboratory. The Quality Assurance program provided is for an Illinois laboratory. Fort Riley is in Kansas. Was this option investigated?	XRF analysis will no longer be utilized at the Fort Riley site. OHM has selected a local laboratory for quick turn-around-time ICP lead.	A
Table 3.1	20	What is the purpose of this table? The SOW requires the sampling requirements in tabular form. See attached table.	OHM has created Table 4.1 in tabular form for sampling activities.	A
3.0	21	Rewrite. Streamline the organization of this section. Colyer Manor specific sampling requirements should be separate from the PSA so the document is easier to use in the field. Put tables in (like the attached table) for each sampling event for each site as a quick reference for the field team.	This section has been rewritten. The Pesticide Storage Area and Colyer Manor site have been separated into sections so that each sampling event is described in full. Section 4.0 also includes tables for each sampling event summarizing the objectives, strategies, and methodologies.	A
3.1 through 3.2	22	Rewrite. See OSWER Directive 9355.0-7B, March 1987, Data Quality Objectives For Remedial Response Activities and attached DQOs from Andrews AFB, MD.	Section has been rewritten.	A
4.1.2	23	Sample number may change in accordance with the grid. Samples for the laboratory should be collected in bottles. The samples for the disposal composite can be collected in the bucket. There is no need to analyze the samples for XRF if they are all being run at a lab. Why are two confirmation samples being taken? The confirmation samples are to be collected off a grid.	Section has been rewritten to address the above comments.	A

Table 4.1	24	Delete. Tables should be in the form of the attached table. The sampling activities outlined in this table are completely out of line with the scope of this work effort. Background sampling locations will be selected by the USACE Kansas City District geologist. The areas of arsenic contamination does not require a 20-foot grid for delineation. Look at the maps of the area provided during the site visit.	This table has been deleted and a new table has been created to cover objectives, strategies, and methodologies of sampling.	A
4.1.3	25	The sampling activity should be briefly described and then the SOP should be included in an appendix. See the Fort Richardson CSAP prepared by Lisa Schwan, Walnut Creek Office. If XRP is going to be utilized (via NL/Taracorp's XRF) the entire sample is to be prepared and then split for XRF and laboratory analysis. This assists in getting a homogenous sample.	All sampling activities have been briefly described. XRF analysis will no longer be necessary.	A
4.2	26	Arsenic contamination is not site wide. See previous comments.	A separate section has been written for the Arsenic area.	A
4.2.2	27	If three-gallon samples are collected from the arsenic area we won't have to clean any thing up. Why can't this material be included in the lead wastestream?	The material will be included in the pesticide wastestream.	A
4.2.3	28	Only samples from the arsenic area will be analyzed for arsenic.	This has been addressed by providing a separate section for the Arsenic area.	A
4.3 and 4.4	29	All of the sampling procedures should be in one place. See Fort Richardson CSAP for guidance on CSAP organization and sampling descriptions.	All sampling procedures for each sampling event are in one section.	A
5	30	A documentation SOP is not provided for review.	Documentation required for the sampling events at Fort Riley are described in Section 5.0.	A

5.1	31	The SOW requires waterproof pens.	This has been added to Section 5.0.	A
5.2	32	Expand and be specific. What field instruments will be used for this project?	Field instrumentation is addressed in Section 8.0. The use of field instrumentation will be strictly for health and safety purposes.	A
5.4	33	Rewrite. Samples will not be consecutively numbered. There should be a numbered grid and when a second round is taken, the same number used with an A or B designation. By numbering this way, only one grid map is needed and as more samples come in, the location is known.	Section 5.4 has been rewritten to address grid location and sampling sequence identification code.	A
6.0	34	No SOP for packaging and handling was included for review. "Generally"...The purpose of this CSAP is to be site specific.	Sample packaging and handling required for the sampling events at Fort Riley are described in Section 6.0.	A
6.1	35	No preservatives (other than 4°C) are required for soil samples. The decontamination water should be added to the soils for disposal. The samples will be placed in one plastic bag. The ice (even blue ice) must be double bagged. See ER 1110-1-263, October 1990. Four custody seals will be placed directly on the cooler.	These have been addressed in Section 6.1.	A
7.0	36	General. If an XRF is not available on-site for real time analysis, this reviewer feels the samples should be sent to a local laboratory for quick (24 hour) ICP screens for metals. This information will be more useful than 38 to 72 hour XRF data. The XRF section and SOPs should be deleted.	OHM will not be utilizing the XRF.	A

7.1.1	37	Analyzing the sample results for statistical probabilities is not part of this work effort. The XRF readings will be calibrated against laboratory results and a corrected "clean up" number will then be used to assure that the XRF is below the desired action level of 500 ppm.	OHM will not be utilizing the XRF.	A
7.2.1	38	The samples will not be analyzed twice. Once is sufficient.	This has been addressed.	A
All Tables	39	CRDLS will not be used. Method detection limits or reporting limits will be used throughout this document. Specific numbers will be provided in the tables, not PQLs.	Specific detection limits have been documented in the new tables.	A
7.2.4	40	It is anticipated that the wastewater generated may be added to the soil wastestream for disposal. Delete table 7.7.	The wastewater will be added to the soil wastestream for disposal. Table 7.7 is still included as Table 7.6 for the possibility that the wastestream does not pass disposal parameters.	A
Table 7-8	41	The USACE requires the 40 CFR 216 App. II, Table 1, Volatile List be run. Are the F parameters really necessary? This is not in the standard disposal package.	The F parameters are not necessary and have been taken out.	A
8.0	42	Be specific. What field screening instruments are being utilized for this work effort.	OHM will use the PID and MSA. This has been documented.	A
8.1.2	43	See previous XRF comments. The XRF analysis is in duplicate before - triplicate here. Be consistent. The laboratory will not run the samples in duplicate. A probability model will not be performed.	OHM will not be utilizing the XRF.	A
9.0	44	Is this a high-pressure wash or steam cleaned?	This concern has been deleted.	A
9.2.1 and 9.3	45	Correct the text. Wash waters will be added to the soil wastestream and disposed.	This has been corrected.	A

9.2.2	46	Correct the text. Use isopropanol for the solvent rinse and a deionized or distilled water wash should follow.	This has been corrected.	A
9.2.3	47	Provide the certificates that accompany the bottles. These should be kept as part of the project files. There should be a certificate in every box.	This has been noted.	A
Exhibit II General	48	The SOPs are not in line with the USACE requirements (this matter has been discussed several times with the Midwest Region). EPA has several sampling SOPs that should be used on future projects. The EPA HTRW Sampling SOPs include the EPA Environmental Response Team: Container Sampling SOPs 2009 and 2010; Sampling the Vadose Zone, SOPs 2012, 2017, 2149, and several OSWER Directives.	The appropriate SOP write-ups have been included within the CSAP rather than as appendices.	A
QP-609 1 - 6	49	Delete.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
7.1 - 7.4	50	Delete	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
7.6	51	This section should be a separate SOP.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
8	52	Delete all equipment which is not specific to this SOP.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
9	53	Delete.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A

QP-628 1 - 6	54	Delete.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
7	55	One method per SOP. Section 7.1 and 7.2 should be separate SOPs.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
8	56	Delete all equipment that is not specific to this SOP - all the decon equipment and one of the augers.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
9	57	Delete.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
QP-612.1	58	Delete. The manual provides more information than this SOP.	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A
QP-612.1.1	59	Delete. These are instructions on how to write a plan. Why do we need them in the field?	This has been addressed by writing within appropriate section what is necessary for the Fort Riley project.	A