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9/8/94

FINAL REPORT FOR THE RAPID RESPONSE REPLACEMENT OF SANITARY SEWER LINE BUILDING 180-183 AT FORT RILEY, KANSAS

CONTRACT NO. DACW45-94-D-005 DELIVERY ORDER NO. 3

Submitted by:

OHM Remediation Services Corp.
Midwest Region

Approved by:

Jerry Resnik
Project Manager

September 8, 1994
Project 15747

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EXECUTIVE SUMMARY

OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation, was contracted under Contract DACW-94-D-005, Delivery Order No. 3, with the United States Army Corps of Engineers (USACE), Omaha District, to execute the removal and replacement of a sanitary sewer line between Buildings 180 and 183 at Fort Riley, Kansas.

The goal of this project was to remove a blocked sewer line and ancillary PCE-contaminated soils to prevent further potential migrations of contaminants and to replace the old sanitary sewer line. Air monitoring was performed, and three underground storage tanks (USTs) adjacent to the site were located. Two of the USTs were removed, and one was abandoned in place.

These goals were accomplished within the original time frames. The old sewer line and ancillary soils were removed and disposed. A new sanitary sewer line was installed, and the excavation was backfilled.

In summary, this Fort Riley project was performed in accordance with the USACE Final Scope of Work dated February 25, 1994, as modified by the direction of the USACE and field conditions.

1.0 INTRODUCTION

The Omaha District of the United States Army Corps of Engineers (USACE) awarded a contract for Rapid Response services for environmental source control and removal actions to OHM Remediation Services Corp. (OHM), a wholly owned subsidiary of OHM Corporation. Individual Delivery Orders are the mechanism for contracting specific work.

1.1 SITE HISTORY

The site is located on Fort Riley in Kansas. Fort Riley has been designated as an National Priorities List (NPL) site. The scope of work (SOW) revolved around the removal and replacement of a sanitary sewer line. The sewer line services the Fort Riley Dry Cleaning Plant and is used to transport wash water from the plant. Leakage from the line during past operations has resulted in the tetrachloroethane (PCE) contamination of soils adjacent to the line. The old sewer line was partially collapsed and blocked.

1.2 DOCUMENT ORGANIZATION

This draft final report details the methods which were employed to perform the work. This final report discusses the SOW in Section 2.0 and describes OHM's technical approach in Section 3.0. Section 4.0 discusses OHM's subcontractor management plan. OHM's project team organization is presented in Section 5.0. The Project Summary is contained in Section 6.0.

The Contractors Sampling and Analysis Plan (CSAP) and Site Safety and Health Plan (SSHP) are included as Appendix A and Appendix B, respectively. Appendix C contains the air monitoring and weather station logs. Appendix D contains the Rapid Response Quality Control Reports and Rapid Response Daily Work Orders. Appendix E contains the analytical data for two rolloffs, manhole debris, underground storage tank (UST) contents, and the soils in the area of the UST excavations. Appendix F contains the waste shipping papers, and Appendix G contains the photodocumentation logs. Appendix H is a letter from Janet Wade from Fort Riley regarding the performance of this project. Appendix I contains the sign in/out log, and Appendix J contains health and safety information. Appendix K is the record of communication regarding the disposal of the roll-off materials at the C/D landfill. Appendix L is the certificate of destruction for the two USTs that were removed. Appendix M is the paperwork from Associated Environmental, Inc., regarding the work concerning the three USTs. The Category III submittals are found in Appendix N.

2.0 SCOPE OF WORK

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

FINAL SCOPE OF WORK FOR
RAPID RESPONSE REPLACEMENT
OF SANITARY SEWER LINE
BUILDINGS 180-183, FORT RILEY, KANSAS
DACW45-94-0005 DELIVERY ORDER NO. 3

Variations and modifications, dictated by field conditions and directions by the USACE, to the aforementioned document are also addressed.

The SOW in general encompassed the following tasks:

- Work plan development
- Mobilization
- Administration and support
- Site preparation and teardown including the set up and teardown of decontamination facilities, support facilities, temporary utilities, temporary utilities, and the establishment of air and weather monitoring stations
- Excavation of the old sewer line
- Installation of a new sewer line
- UST cleaning, removal, and abandonment
- Transportation and disposal
- Demobilization

2.1 FINAL REPORT DEVELOPMENT

The project final report describes how the work was performed according to the SOW as delineated by the USACE, environmental industrial standards, construction industrial standards, health and safety requirements, and field conditions.

The final report also consists of an SSHP, a CSAP, and various appendices. Site-specific Advance Agreements (SSAA) are included in the cost proposal which has been submitted under a separate cover.

The USACE supplied SOW served as the basis for the preparation of this final report and associated documents.

2.2 MOBILIZATION/DEMOBILIZATION

This task involved the actual transportation of personnel, equipment, materials, and other resources to and from the project site. A majority of the personnel and equipment was already on site from a previous Fort Riley project. The personnel already on site included the site supervisor, project accountant, technician, and recovery technicians. A health and safety officer, equipment officer, and the project manager were mobilized from OHM's office in Findlay, Ohio, and an equipment operator was mobilized from OHM's office in Port Allen, Louisiana. The equipment that was rented included a Case 621 and JD-690, analytical equipment, and administrative equipment. The OHM decontamination trailer was from OHM's Illinois office. Subcontractor mobilization/demobilization was managed by the OHM project manager in close conjunction with site supervisory personnel.

2.3 SITE PREPARATION AND TEARDOWN

The USACE provided site access. Prior to the performance of on-site work, OHM procured subcontracts, coordinated with local hospitals, authorities, and utilities as was necessary. This process continued as needed throughout the performance of the project.

The on-site preparation task included the placement of office and decontamination trailers and the establishment of the exclusion zone, contamination reduction zones, and support/clean zones. Traffic on Custer Avenue was reduced to one lane with the use of barrels, temporary fencing, and caution tape. Temporary signal lights were installed by B&W Electrical Contractors to control the flow of traffic.

A portable decontamination station was placed at the outer perimeter of the exclusion zone. Heavy equipment was washed with a pressure washer at the decontamination station at the conclusion of the project. The portable decontamination station consisted of bermed reinforced polyethylene.

2.4 OLD SEWER LINE EXCAVATION

The location of the old sewer line was determined by visual inspection of the manholes coordinated with the use of the site maps provided. This location was marked. The areas covered by asphalt were cross cut and removed. The asphalt and concrete were placed in a 10 yard rental dump truck. No ancillary soils were included. It was subsequently disposed of as nonhazardous construction debris at the C/D Landfill. Approximately 20 cubic yards of asphalt were disposed.

The old sewer pipe was excavated. Upon exposure of the old sewer pipe, the excavation was shored using hydraulically jacked aluminum shoring provided by the Shoring and Supply Company, Inc. After receiving refresher shoring training from OHM's Director of Health and Safety and experts from the Shoring and Supply Company, the site superintendent served as the competent person relative to the shoring installation. Because it was determined that the shoring was being installed in Type C soils with a design selected in accordance with tabulated data, no soils testing was necessary. The USACE health and safety officer (Jim Woolcott) approved the shoring design. The sewer pipe, along with ancillary soils, was removed and placed in lined roll-off boxes. An apparent washout area, under the pavement, between the lower manhole and Building 180 was noted as the excavation proceeded in this area. The area undermined appeared to be approximately 4 feet wide, 1 foot deep, and 1 1/2 feet wide.

Excavated soils were screened for PCE contamination approximately every 7 cubic yards. The screening was performed with a PID. The readings never approached the action limits that had been previously established for this site (75 ppm).

During the excavation of the sewer line, an 18-inch sanitary storm sewer was damaged. This was repaired with materials provided by Fort Riley prior to the backfilling of the excavation. Also, during the excavation a 6-inch water line, an 8-inch gas line, and a 1-inch fiber optic line were successfully uncovered with the trackhoe. This precluded the need for the lengthy and laborious hand digging that was originally anticipated. During the excavation, an 8-inch clay pipe was damaged and DEH personnel informed OHM that the clay pipe was an abandoned line, so it was not repaired. Near the completion of the excavation, it was noted that there was no apparent connection between the sewer line pipe and the manhole; and, the inlet at the bottom of the manhole was not a drop inlet for the pipe being replaced. During the excavation, the lower manhole became plugged and caused the upper manhole to overflow. This water was temporarily diverted to the next manhole down the line of flow. The lower manhole was pumped down and cleaned out and this appeared to rectify the problem.

2.5 SEWER LINE INSTALLATION

Upon completion of the excavation, the sewer line was replaced. Installation was in accordance with Appendix J, Environmental Engineering Instructions. Figure 2.1 and Figure 2.2 show the actual placement of the new sewer line and its connections to the manholes. Figure 2.3, which was provided by Fort Riley, is a map of the general sewer line layout.

2.6 EXCAVATION BACKFILL

Upon completion of the sewer line installation and acceptance by the USACE field representative, the backfilling of the excavation was completed. Prior to the final backfill, after a strong evening rain, settling of backfill material (primarily excavated soils) was observed. More fill was added to these areas to restore them to grade, and minimal compaction was performed. Additional gravel was also added in the area of Custer Avenue. Compaction of the excavation was performed as directed by the USACE on-site representative (OSR).

2.7 CONTRACT MODIFICATIONS

Contract Modification P00001 called for the construction of a meteorological weather station and the erection of three exclusion zone perimeter air monitoring stations to provide support to the U.S. Army Corps of Engineers, Kansas City District, in their site investigation and subsequent preparation of a Baseline Risk Assessment for the dry cleaning facility. This was accomplished in the early stages of the project.

Table 2.1

CONTRACT MODIFICATIONS

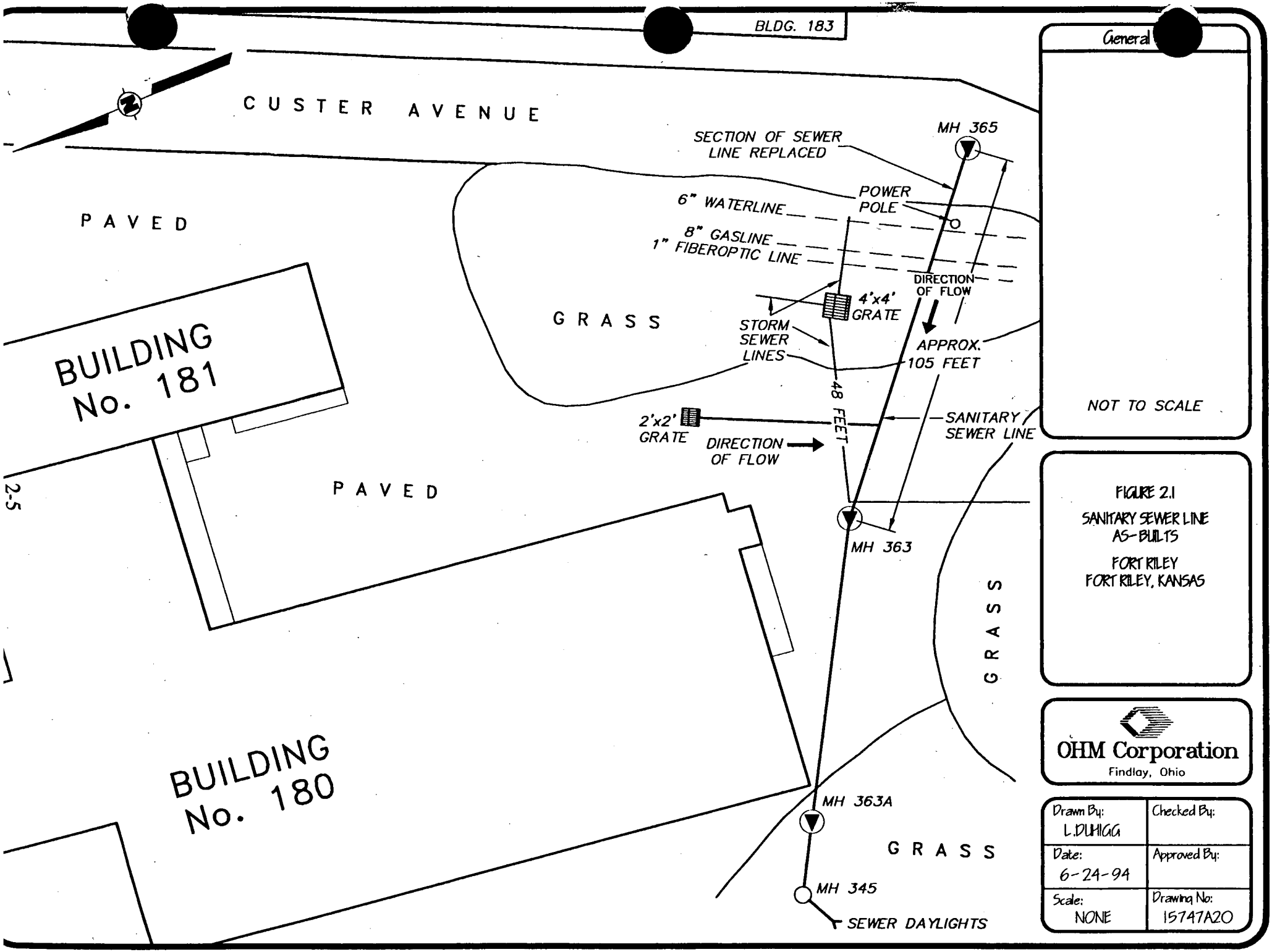
No.	Modification
P00002	Allowed for the location and sampling of three USTs located between Building 180 and Custer Avenue.
P00003	Allowed for the cleaning and removal of two USTs and the cleaning and in-place abandonment of one UST.

2.8 TRANSPORTATION AND DISPOSAL

All hazardous and nonhazardous materials generated during the course of the performance of the requirements of this Delivery Order were transported and disposed. Construction debris was disposed of at the C/D Landfill. The materials in the roll-off were disposed of at Fort Riley's active construction debris landfill and the small amount of hazardous waste generated was disposed of through Fort Riley's Defense Reutilization and Marketing Office (DRMO).

2.9 DEMOBILIZATION

Personnel and equipment were removed from the site back to their respective response centers.



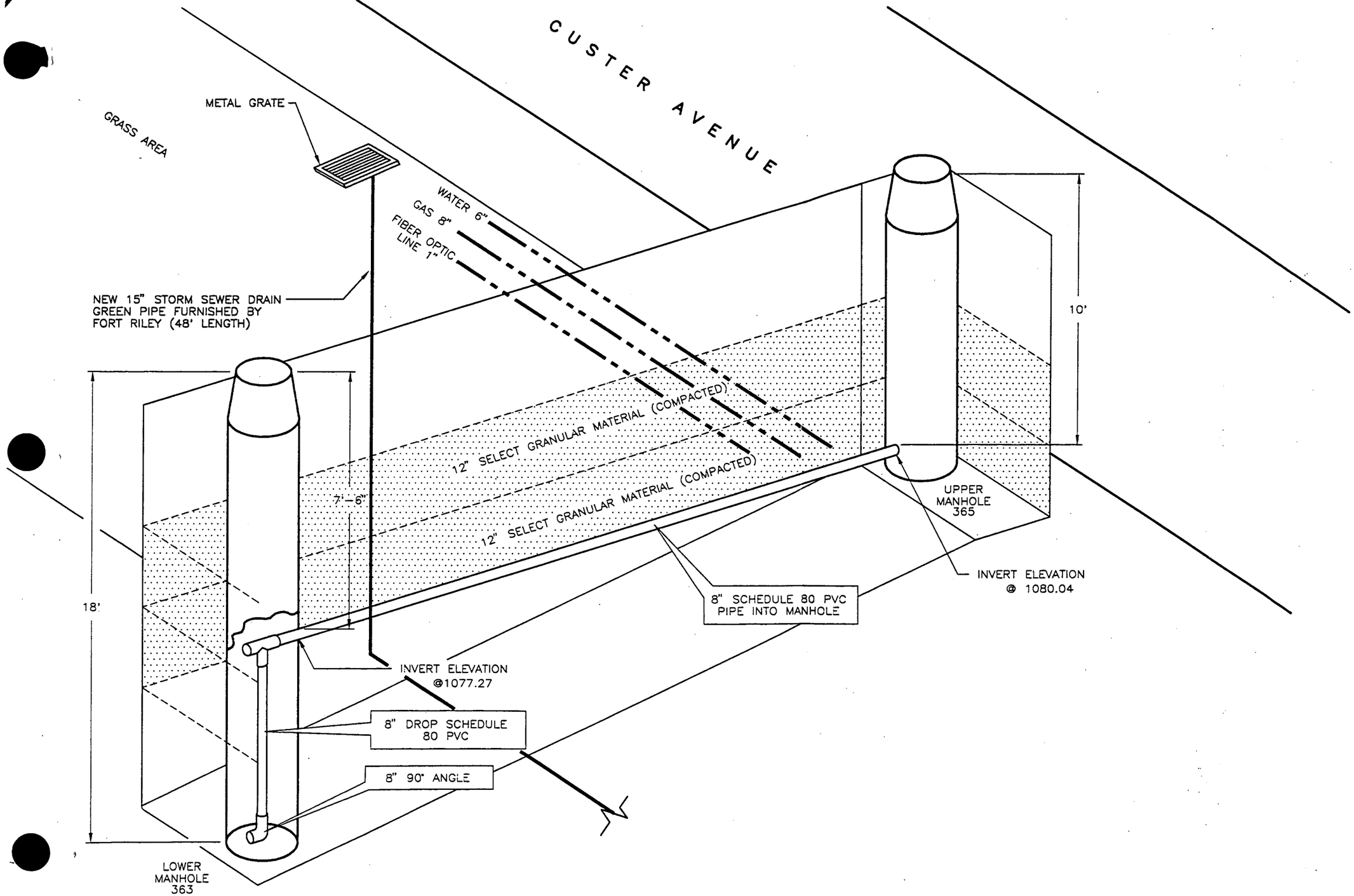
General

NOT TO SCALE

FIGURE 2.1
SANITARY SEWER LINE AS-BUILTS
FORT RILEY
FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIGG	Checked By:
Date: 6-24-94	Approved By:
Scale: NONE	Drawing No: 15747A20



General Notes:

THE NEW SEWER LINE WAS TIED INTO THE LOWER MANHOLE LIKE THE OLD SEWER LINE, i.e., THE ELEVATION DROP WAS ACCOMPLISHED WITH A VERTICAL SECTION OF PVC PIPE LOCATED IN THE INTERIOR OF THE MANHOLE.

No.	Revision/ Issue	Date

FIGURE 2.2
AS-BUILT SANITARY SEWER LINE

USACE
FORT RILEY, KANSAS

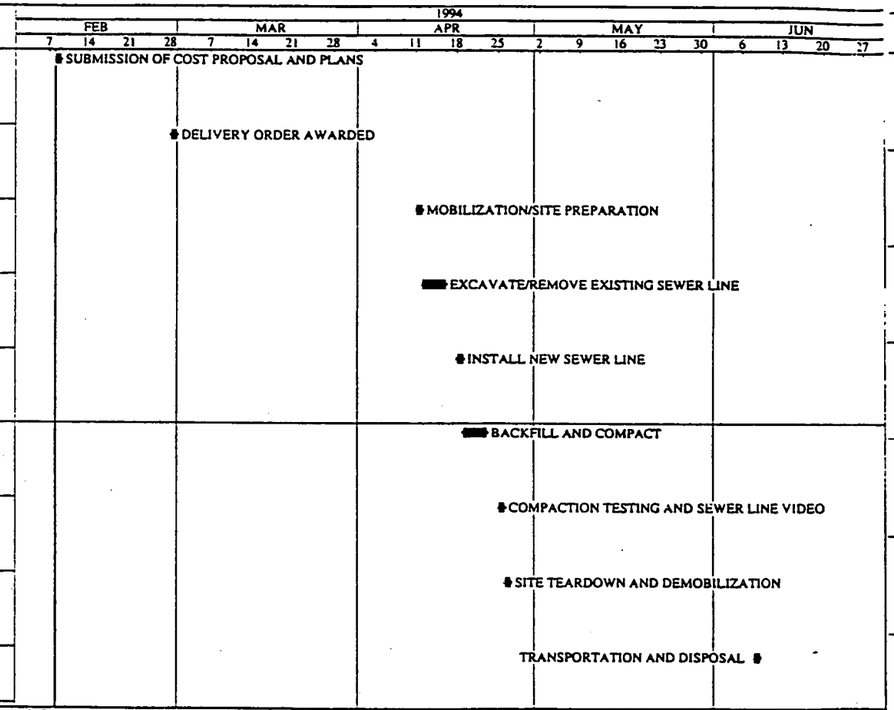
OHM Corporation
Findlay, Ohio

Drawn By: L. DUHGG	Checked By:
Date: 5-16-94	Approved By:
Scale: NONE	Drawing No: 15747-A1

FIGURE 3.1

SCHEDULES

ACTIVITY ID	EARLY START	EARLY FINISH	REM DUR	PCT
100	8FEB94A	8FEB94	1	0
200	28FEB94	28FEB94	1	0
300	11APR94	11APR94	1	0
400	12APR94	15APR94	4	0
500	18APR94	18APR94	1	0
600	19APR94	22APR94	4	0
700	25APR94	25APR94	1	0
800	26APR94	26APR94	1	0
900	8JUN94	8JUN94	1	0



Plot Date 22JUN94
Data Date 8FEB94
Project Start 8FEB94
Project Finish 8JUN94

(c) Primavera Systems, Inc.

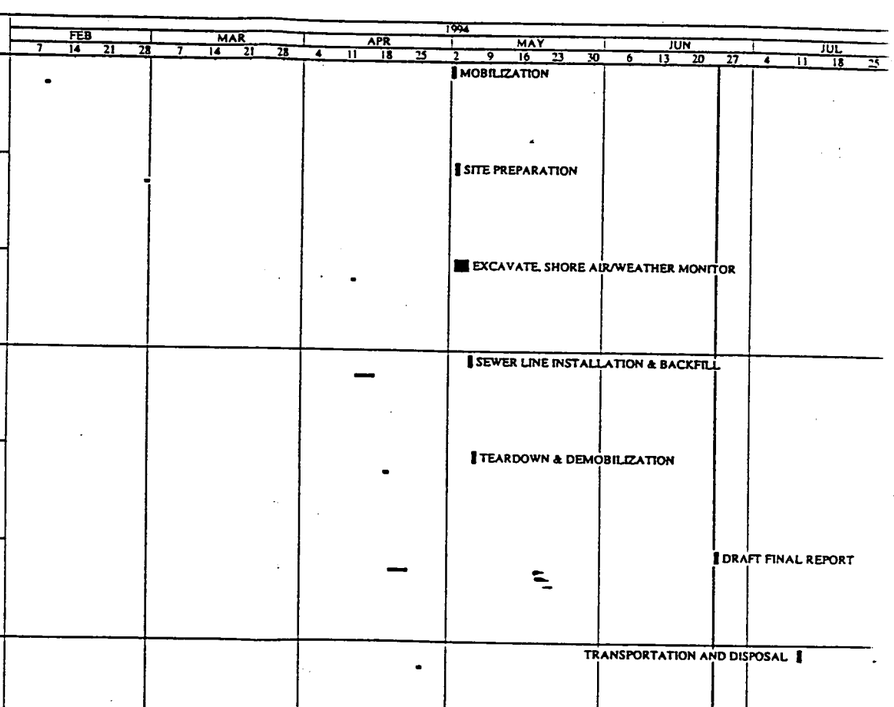
Activity Bar/Early Dates
Critical Activity
Progress Bar
Activity Late Dates
Milestone/Neg Activity

USACE
FORT RILEY SEWER LINE REPLACEMENT
PROJECTED SCHEDULE

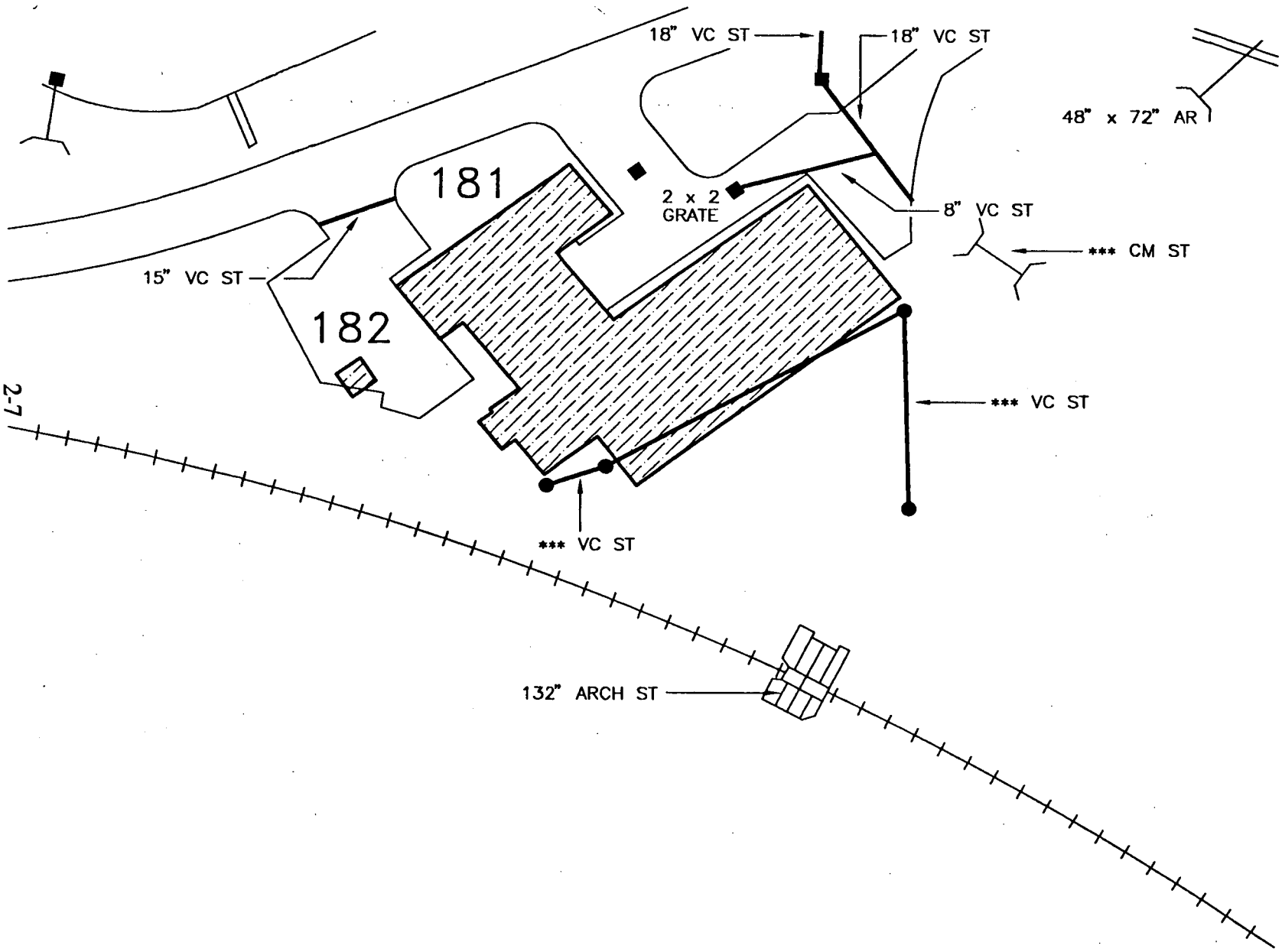
SANITARY SEWER LINE REPLACEMENT FORT RILEY

Date	Revision	Checked	Approved

ACTIVITY ID	EARLY START	EARLY FINISH	REM DUR	PCT
100	1MAY94A	1MAY94A	0	100
200	2MAY94A	2MAY94A	0	100
300	2MAY94A	4MAY94A	0	100
400	5MAY94A	5MAY94A	0	100
500	6MAY94A	6MAY94A	0	100
600	24JUN94A	24JUN94A	0	100
700	11JUL94	11JUL94	1	0



USACE
FORT RILEY SEWER LINE REPLACEMENT
PROJECTED ACTUAL SCHEDULE



Gener[illegible]s:

FIGURE 2.3
GENERAL SEWER LINE LAYOUT
(PROVIDED BY FORT RILEY)

FORT RILEY
FORT RILEY, KANSAS

OHM Corporation
Findlay, Ohio

Drawn By: L.DUHIG/G	Checked By:
Date: 9-1-94	Approved By:
Scale: NONE	Drawing No: 15747-A2

3.0 TECHNICAL APPROACH

This section discusses the operational methods, types of personnel, and equipment which were utilized to complete the SOW.

3.1 SCHEDULE MONITORING AND CONTROL

Figure 3.1 shows the original and actual schedules for this project. As the figure illustrates, field operations were accomplished significantly faster than originally anticipated. The schedule was monitored and controlled in conjunction with the tracking of costs through the use of computerized cost and resource tracking and project management techniques developed by OHM.

3.1.1 Submittal

The first submittal under this solicitation was the draft project work plans dated March 4, 1994. The draft project work plan contained a draft SSHP, draft CSAP, draft Work Plan, Cost Proposal, SSAA, and OHM Corporation Literature/Brochure. Upon the conclusion of negotiations, final project work plans were submitted.

The USACE received daily submittals at the close of business. The daily submittal included the Rapid Response Quality Control Daily Report and Work Order.

OHM prepared hazardous waste profiles and manifests for the USACE review, approval, and signature prior to the shipment of any hazardous wastes. There were no shipping papers for nonhazardous wastes that required transportation and disposal from this project. Mike Kinder, the Midwest's Region Contract Regulatory Specialist, reviewed all waste profiles, land disposal restriction notifications, certifications, and waste manifests prior to their submittal to the USACE.

OHM's Transportation and Disposal (T&D) Department submitted all relevant supporting documentation such as analytical reports and material safety data sheets (MSDSs) with the aforementioned documents. These were accompanied by a cover letter describing the logic by which OHM arrived at its recommended disposal strategy. OHM did not ship wastes without the prior approval and signature of waste manifests by the USACE.

3.2 PRE-CONSTRUCTION ACTIVITIES

Pre-construction activities for this project included the following items:

- Issuing subcontracts
- Sourcing OHM internal resources
- Identifying T&D alternatives

OHM understood that the USACE would arrange for any rights of entry necessary.

3.3 CONSTRUCTION ACTIVITIES

Construction activities included:

- Site preparation including the set up of support zones, decontamination stations, exclusion zones, traffic control, and the establishment of air and weather monitoring stations
- Removal of asphalt and concrete paving
- Excavation of the existing sewer line
- Installation of a new sewer line
- Backfill and compaction of excavation
- Location of three USTs
- Removal of UST contents, cleaning and removal of two USTs, and the cleaning and in-place abandonment of one UST
- T&D of asphalt, concrete old sewer line, ancillary soils, and PPE

3.3.1 Site Preparation

Site preparation included the establishment of support zones, a decontamination area, an exclusion zones, traffic control, and the establishment of air and weather monitoring stations.

The exclusion zone was the area immediately adjacent to the excavation. This area was approximately 110 feet long, 40 feet wide at the base, tapering down to approximately 15 feet as it approached Custer Avenue. .

The decontamination area was located immediately adjacent to the exclusion zone. The decontamination area consisted of a bermed polyethylene area. The decontamination area was used to decontaminate any heavy equipment leaving the exclusion zone.

All personnel in the exclusion zone were required to pass through the decontamination station. Disposable protective clothing was placed in the roll-offs along with the old sewer line and ancillary soils. Specific details regarding personnel decontamination procedures are described in the SSHP.

The support trailer was placed adjacent to the decontamination area.

3.3.2 Excavation and Sewer Line Installation and Backfill

Asphalt and Concrete Removal

Prior to beginning the excavation, the existing asphalt and concrete over the area of anticipated excavation was cross cut using a walk behind saw, facilitating the removal of the asphalt. The asphalt was removed utilizing a John Deere 490 trackhoe. A Case 621 loader was used to facilitate the movement of excavated soils. The asphalt and concrete that was removed was directly loaded into a 10 yard dump truck and transported to the C/P Landfill. No ancillary soils were included. It is estimated that approximately 20 cubic yards of material was generated.

Old Sewer Line Excavation

Prior to the removal of the old sewer line, the flow of the discharge from the dry cleaning plant was redirected from the old sewer line by pumping the discharge directly from the upper manhole to the lower manhole.

Upon completion of the asphalt removal, the excavation of the old sewer line commenced. A John Deere 490 trackhoe was utilized for the excavation. As the excavation proceeded, the excavated soil was screened utilizing a Photoionization Detector (PID). Soils screened never approached the actions limits previously established for this site (75 ppm). Stockpiled soils were temporarily stored on 6 mill polyethylene bermed area. The stockpiles were covered with polyethylene.

Once the old sewer line was exposed it was removed utilizing a John Deere 490 trackhoe. It should be noted that there was no apparent connection between the pipe and the manhole, and the inlet at the bottom of the manhole was not a drop inlet for the pipe being replaced. The old sewer line and any ancillary soils removed with the old sewer line were placed in two lined roll-off box. A sample of this material was analyzed and characterized for disposal. Appendix E contains all analytical results, and Table 3.1 presents the results. This material was disposed of at Fort Riley's active construction debris landfill. It is estimated that approximately 26 cubic yards of material was generated and subsequently disposed of. During the excavation, an 8-inch clay pipe was damaged. OHM personnel were informed by DEH personnel that the pipe was abandoned, therefore it was not repaired. After OHM demobilized from the site, OHM learned that the line was active and had been repaired by DEH personnel who replaced the line and connected it to the 18-inch green PVC placed by OHM.

TABLE 3.1
ROLL-OFF ANALYTICAL RESULTS

Sample #	Contaminant	Results
15747-001	Tetrachloroethane	.0022 mg/L
15747-002	Tetrachloroethane	25.1 ug/kg

At the direction of the USACE OSR and at the request of Fort Riley personnel, the upper manhole was cleaned of sludges and other materials. These materials were placed in a 10-gallon drum and then into a 55-gallon drum after the 10-gallon drum was damaged by another contractor. A sample of this material was taken and analyzed. This material was subsequently disposed of through Fort Riley's DRMO.

Shoring Operations

After the old sewer line was removed, the excavation was shored utilizing aluminum hydraulic shoring with 1.5 inch by 4 foot by 8 foot plywood reinforcement to allow safe personnel access to the excavation. The plywood was utilized because it was mutually determined by qualified USACE and OHM personnel that the soils were Class C.

New Sewer Line Installation

Upon completion of the shoring operation, the new sewer line was installed. The new sewer line was installed in accordance with Appendix J, Environmental Engineering Instructions in the work plan. A leakage test was not required per the direction of the USACE.

Upon successfully passing the USACE visual inspection the excavation was backfilled. Excavated soils were placed as final backfill, placed directly above the initial backfill and received minimal compaction using the bucket of the trackhoe. Minimal compaction was used because of the upcoming soil vapor extraction (SVE) remediation project. Staged uncontaminated soils were used as final backfill. The uncontaminated soils were compacted in accordance with the direction of the USACE OSR. No compaction testing was required by the USACE OSR.

At all times during field operations, open excavations were barricaded with caution tape and temporary fencing.

Real time air monitoring was performed using a photoionization detector during field construction activities. Weather monitoring was performed utilizing a R-Met Rainwise Weather Station during the performance of the project. The readings are contained in Appendix C.

Expended PPE was sampled and characterized for disposal. The expended PPE was placed in the roll-offs along with the old sewer line and ancillary soils.

Custer Avenue was patched with new asphalt.

3.3.3 UST Location, Removal and Abandonment

During the replacement of the sanitary sewer line, the three USTs were located by exposing their tops. During the week of July 11, 1994 a small crew returned to remove the USTs. After commencement of the excavation to expose the tanks, it was quickly discovered that one tank was significantly larger than expected. The larger tank was vertically placed and was approximately 7 feet across and approximately 17 feet deep. Because of the larger tank's proximity to Building 180 and a power pole, Fort Riley personnel decided to abandon that tank in place.

The tank tops were fully exposed with a tracked excavator. The contents of each tank were transferred to a vac truck for disposal at Essex Waste Management Services, Inc. Waste shipping papers are contained in Appendix F. Each tank was then purged with nitrogen to inert the tanks' atmosphere. This was confirmed with an explosimeter. The tanks were then cleaned, and the rinsates were transferred to the vac truck. The two smaller tanks and associated piping were removed, and the tanks were rendered unusable. Samples were taken of the soils in the excavation, and six of these samples were sent to Environmental Control Corporation (ECC) to be analyzed for SVOCs, volatile organic compounds (VOCs), and hydrocarbons. This analysis is included in Appendix E. The larger tank was filled with approximately 25 cubic yards of washed sand. The tank manway was grouted, and all the lines into the building were cut off at the building and grouted. The excavated area was backfilled, seeded, and fertilized.

Brad Johnson, a State of Kansas Certified UST remover from Associated Environmental, oversaw the work efforts, and Howard Debauche, from the State of Kansas, was also present on the July 14, 1994. Abdul Al-Assi from Fort Riley was also present periodically.

4.0 PROJECT TEAM AND ORGANIZATION

The project team included:

- Program Manager: John Hitchings
- Project Manager: Jerry Resnik
- Site Supervisor: Bill Fenwick

OHM selected other individuals from its staff for the following positions: truck driver, sample technologist/safety officer, T&D coordinator, purchasing agent, PA, equipment operator and recovery technician.

5.0 SUMMARY

An important fact during this project was that there was a small washout under the pavement near Manhole #363 (the lower manhole). It appeared that the old sewer line was not connected to the manhole. Also, the initial backfill settled in spots after a heavy rainfall. The excavation was again brought up to grade with additional fill material and gravel.

One could determine that the old sewer line simply experienced natural deterioration over time. The type of manhole uncovered was commonly used decades ago. It could be assumed that the old sewer line was this old. Using the new line for its intended purpose, i.e., transportation of rinsewaters, should optimize its life.

In summary, this project was performed safely, within the operational schedule, and slightly under budget. OHM strongly recommends the use of hydraulically jacked aluminum shoring for any future projects that contemplate trenching activities. This type of shoring is economical, easy to install, and very safe.

APPENDIX E

ANALYTICAL DATA

Memo

OHM Corporation

16406 U.S. Route 224 East • Findlay, Ohio 45840

Midwest Region

TO: Jerry Resnick

FROM: Chet Scheibel

PC:

DATE: July 28, 1994

SUBJECT: Data Review for the Fort Riley Project 15747

The Midwest Region Environmental Chemistry Group has performed a QA Audit of the data submitted by the ECC Laboratory for the six (6) soil samples collected on July 14, 1994. This data is for the analysis of volatiles, semivolatiles, diesel range organics (DRO), and gas range organics (GRO). The laboratory met the required 7 day turn-around-time. The sample numbers are 0001 through 0006.

The results of this audit are presented in the attached Data Evaluation Checklist. The data conforms to the requirements of USEPA Methods 8240, 8270 and mod-8015 with the following comment:

- GRO - Sample 001 and 002 surrogate was diluted out of analytical range due to the large amount of GRO in samples.

The minor data discrepancies identified above do not invalidate this data package. The data is deemed acceptable according to USEPA guidelines and should be used without reservation in this project's decision making process.

C Kit - S. Scheibel

Chet Scheibel
Project Chemist
Environmental Chemistry
Midwest Region

OHM MIDWEST REGION
TECHNICAL SERVICES GROUP
ANALYTICAL DATA VALIDATION

The attached Data Package has been reviewed by the Midwest Region Technical Services Group. Detailed comments concerning specific analyses (ie, GC/MS Semivolatiles) are provided in the attached review sheets. Any additional comments conerning the data package as a whole are listed below.

COMMENTS: TAL submitted as 7 day TAT.

Data Validated by: Kat Schield Date: 7/28/94

DATA VALIDATION FORMS

HOLDING TIMES	REQUIREMENTS	YES	NO
METALLIC INORGANIC			
Metals	6 Months		
Cyanide	14 Days		
Mercury	28 Days		
Hexavalent Chromium	24 Hours		
SEMIVOLATILE - GC OR GC/MS			
WATER	7 Days to Extraction		
Analyzed within 40 days of extraction			
SOIL	14 Days to Extraction	✓	
Analyzed within 40 days of extraction		✓	
VOLATILES - GC OR GC/MS			
WATERS for AROMATICS	7 Days unpreserved		
	14 Days preserved		
SOILS, SLUDGES, SEDIMENTS	14 Days	✓	
Other GRO	14 Days	✓	
PESTICIDES/PCBs			
WATER	7 Days to extraction		
Analyzed within 40 days of extraction			
SOILS, SEDIMENTS, SLUDGES, SOLIDS	14 Days to extraction		
Analyzed within 40 days of extraction			
CONVENTIONALS/OTHER ORGANICS			
SOLIDS/SLUDGES Analyzed Within Holding Time	Per Method		
WATERS/LIQUIDS Analyzed Within Holding Time	Per Method		
PRESERVATION			
Preserved at field site?			
Lab preserved sample.			

LIST DEFICIENCIES IN DETAIL: _____

DATA VALIDATION AND QUALITY CONTROL

VOLATILE ANALYSIS BY GC GRO			
	REQUIREMENT	YES	NO
INITIAL CALIBRATION	RSD: < OR = 20% - OR LINEAR CORRELATION > OR = 0.995		
CONTINUING CALIBRATION CHECK COMPOUNDS	RSD: < OR = 15%		
METHOD BLANK	EVERY BATCH OR 20 SAMPLES	✓	
	ALL COMPOUNDS < MDL	✓	
ALL QC SAMPLES	ANALYZED ON SAME INSTRUMENT AS SAMPLES	✓	
METHOD SPIKE % RECOVERY	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE DUP. RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
SURROGATE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	001 002

NOTE DEFICIENCIES BELOW IN DETAIL: Samples 001 & 002 analyzed diluted out range

DATA VALIDATION AND QUALITY CONTROL

SEMIVOLATILE ANALYSIS BY GC ~~OR HPLC~~ - OTHER DRO			
	REQUIREMENT	YES	NO
INITIAL CALIBRATION	RSD: < OR = 20% - OR LINEAR CORRELATION > OR = 0.995	NR	
CONTINUING CALIBRATION CHECK COMPOUNDS	RSD: < OR = 15%	NR	
METHOD BLANK	EVERY BATCH OR 20 SAMPLES	✓	
	ALL COMPOUNDS < MDL	✓	
METHOD SPIKE % RECOVERY	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE DUP. RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
SURROGATE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	

NOTE DEFICIENCIES BELOW IN DETAIL: _____

DATA VALIDATION AND QUALITY CONTROL

VOLATILE ANALYSIS BY GC/MS			
	REQUIREMENT	YES	NO
TUNE CALIBRATION CHECK	BFB EVERY 12 HRS	✓	
INITIAL CALIBRATION	%RSD: < OR = 30%	N A	
CONTINUING CALIBRATION CHECK	%SD: < OR = 25%	✓	
SPCC COMPOUNDS	RF: > OR = 0.0300	✓	
	Bromoform: > OR = 0.250	✓	
RSD OF INITIAL CALIBRATION	<30% OF LINEAR CORRELATION OF 0.995 OR BETTER	N A	
METHOD BLANK	EVERY BATCH OR 20 SAMPLES	✓	
	ALL COMPOUNDS <MDL	✓	
	ANALYZED ON SAME INSTRUMENT AS SAMPLES	✓	
ALL QC SAMPLES	ANALYZED ON SAME INSTRUMENT AS SAMPLES	✓	
METHOD SPIKE % RECOVERY	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE DUP. RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
SURROGATE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	

NOTE DEFICIENCIES BELOW IN DETAIL: _____

DATA VALIDATION - CALIBRATION AND QUALITY CONTROL

SEMIVOLATILE ANALYSIS BY GC/MS			
	REQUIREMENT	YES	NO
TUNE CALIBRATION CHECK	DFTPP EVERY 12 HRS	✓	
INITIAL/CONTINUING CCC	%RSD: < OR = 30%	✓	
INITIAL/CONTINUING SPCC	RF: > OR = 0.05	✓	
METHOD BLANK	EVERY BATCH OR 20 SAMPLES	✓	
	ALL COMPOUNDS <MDL	✓	
METHOD SPIKE % RECOVERY	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE RECOVERY LIMIT	WITHIN THOSE SET BY LAB	✓	
MATRIX SPIKE DUP. RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	
SURROGATE RECOVERY LIMITS	WITHIN THOSE SET BY LAB	✓	

NOTE DEFICIENCIES BELOW IN DETAIL: _____

ENVIRONMENTAL CHEMICAL
CORPORATION

Tel (513) 752-2950 • Fax (513) 752-2261
3235 Omni Drive • Cincinnati OH 45245

July 22, 1994

MIDWEST TECHNICAL SERVICES
O.H. MATERIALS CORPORATION
ATTN: Chet Scheibel
16406 U.S. Route 224 East
Findlay, Ohio 45840-0551

Dear Mr. Scheibel:

Please find enclosed the results of analysis for the 6 samples received on July 16, 1994.

If you have any further questions, please feel free to contact me at (513) 752-2950.

Sincerely,

for Mona Risk, Ph.D.
Director

MR:jw

Enclosures

Memo

OHM Corporation

16406 U.S. Route 224 East • Findlay, Ohio 45840

Midwest Region

TO: **Jerry Resnick**

FROM: Chet Scheibel

PC:

DATE: July 25, 1994

SUBJECT: Fort Riley Project 15747 - UST Tanks

After review of the data from ECC, I noticed that the amount of GRO versus VOC compounds did not match in samples 001 and 002; ie, large amount of GRO and no BETX compounds in the VOC analysis. I discussed this situation with the lab manager and other personnel. They told me that upon review of the raw data for the gas, that no BETX compounds appeared in the chromatograms. The GC eluent passes through a PID (BETX) detector prior to an FID (GRO). BETX compounds did not appear in the PID detector chromatogram. Therefore, the VOC analysis would also not find the BETX compounds.

The lab is preparing a Case Narrative for the final report to explain lack of BETX in the VOC analysis.

Chet Scheibel

Chet Scheibel
Project Chemist
Environmental Chemistry
Midwest Region

ENVIRONMENTAL CHEMICAL
CORPORATION

Tel (513) 752-2950 • Fax (513) 752-2261
3235 Omni Drive • Cincinnati OH 45245

July 25, 1994

O.H. MATERIALS CORPORATION
ATTN: Mr. Chet Scheibel
16406 U.S. Route 224 East
Findlay, OH 45840

Dear Mr. Scheibel,

There appears to be a couple of discrepancies in the analytical results reported for the samples from Ft. Riley analyzed by our laboratory. I would like to give some information that may help to explain this.

The first problem is the report of values for gasoline, in the absence of any values for VOA's, diesel and semivolatiles on sample 0001(tank bottom 1). We believe this is due to differences in the two sample containers received by our laboratory. One container consisted of a light brown sand only. This container was analyzed for VOA's then semivolatiles and diesel. When it was time to analyze the sample for gasoline the analyst used the second container because it had not been opened before. This container held a grayish clay material in addition to the light brown sand. The analysis of this container gave a value for gasoline. The grayish clay appears to be the same as the material in sample 002(tank bottom 2) which showed values on all the analyses. Our conclusion is that the sand is free of the contamination while the clay is not.

The second problem is the report of a gasoline value for sample 002(tank bottom 2) without reporting a value for BETX in the VOA analysis. We calibrated our gasoline analysis by the use of a gasoline standard. The range of hydrocarbon reported extends beyond the xylenes on the chromatogram. At the dilutions this sample was analyzed, there was very little evidence of aromatic compounds prior to and including the xylenes (this was determined by looking at the PID detector trace which was collected along with the FID signal), but a large hydrocarbon fraction was found. This is confirmed by the VOA analysis which reported TIC's of hydrocarbons, as well as the semivolatile analysis which reported a similar high concentration of hydrocarbons in the TIC report.

ENVIRONMENTAL CHEMICAL CORPORATION

CASE NARRATIVE

Customer Project No.: 19365

Customer Name: OHM

Sample Source: Fort Riley

1. QC Package belongs to Batch No. GASOL19

2. QC Package for this Prep. Batch is from this Project? (YES)/NO
   If no, where can the QC package be found? Work Order_____ Project_____

3. Describe any problems: dilution - special duplicate, surrogate low recoveries - QC recoveries, sediment problem, instrument problem, extraction problem, etc. If no problem, write NO in the blank space.

Sample 001 and 002 were nonhomogenous heavily contaminated soils which required several dilutions before results were obtained within the gasoline curve range.
Sample 005 was most contaminated during its first run. This is probably due to evaporation of the analytes upon opening of the sample.

REVIEW

Level 1. **Initial** MM **Date** 7-21-94

Level 2. **Initial** [illegible] **Date** 7/21/94

Level 3. **Initial** [illegible] **Date** 7/21/94

ENVIRONMENTAL CHEMICAL CORPORATION

CASE NARRATIVE

Customer Project No.: 15747

Customer Name: O.H. Materials Corp

Sample Source: 19365

1. QC Package belongs to Batch No. VS0720-2

2. QC Package for this Prep. Batch is from this Project? (YES) NO
   If no, where can the QC package be found? Work Order_____ Project_____

3. Describe any problems: dilution - special duplicate, surrogate low recoveries - QC recoveries, sediment problem, instrument problem, extraction problem, etc. If no problem, write NO in the blank space.

Sample NO. 2 had no targets but had high levels of hydrocarbons. This sample was first ran at 5g but gave no useable data. Was rerun at 1g and reported as such. Samples 3, 4 & 5 were rerun because of carry over of sample 2 on 7/20

Level 1.	**Initial** FMD	**Date** 7/22/94
Level 2.	**Initial** M	**Date** 7/22/94
Level 3.	**Initial** ww	**Date** 7/22/94

ENVIRONMENTAL CHEMICAL CORPORATION CHECK LIST

roject No: 19365 Lab Check: RC (Initials)

Narrative: ✓ Cust. Check: _____

[redacted]one/Fax: —

AMPLES:	BNA (S)	VOA (S)	PEST/PCB	HERBICIDE	TPH(P) (S)	TPH(E) (S)
ield Samples (+ TIC)	✓	✓			✓	✓
lethod Blank	✓	✓			✓	✓
uplicate	✓	✓			✓	✓
S/MSD	✓	✓			✓	✓
CS	✓	✓			✓	✓
ining Check	✓	✓			✓	✓
alibration Check	✓	✓			N/A ✓	N/A ✓

MPLES:	Metals
mples	
[redacted] Blank	
plicate	
/MSD	
S	
/CCV	
/CCB	
A	

MISCELLANEOUS

SAMPLES:	ANALYSES:
Samples	
Method Blank	
Duplicate	
MS/MSD	
LCS	

STODY DOCUMENT:

omer Chain-of-Custody	✓
ler Receipt Form	✓
ill Documents	✓
ple Log-in Sheet	✓
[redacted] Corrective Action	✓

ENVIRONMENTAL CHEMICAL CORPORATION

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Analysis: Gasoline
[redacted]: Mod. EPA 8015
[redacted] Notebook: 415, Pg. 44
Preparation Batch: GASS0719

Cust. Proj. No.: 15747
Project No.: 19365
Date Received: 07/16/94
Date Analyzed: 07/19/94 - 07/20/94
Instrument Batch: BG0719

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	TPH	D.L. (mg/kg)	RESULT (mg/kg)	Bromofluorobenzene (% Recovery)
19365-001	0001 From Bottom of Tank 1 Soil	SOIL	Volatile (gasoline range)	0.050	1770	@
19365-002	0002 Soil From Bottom of Tank 2	SOIL	Volatile (gasoline range)	0.050	1260	@
19365-003	0003 Soil From West End of Excavati	SOIL	Volatile (gasoline range)	0.050	ND	81
19365-004	0004 Soil From Bottom Side of South	SOIL	Volatile (gasoline range)	0.050	ND	85
19365-005	0005 Soil Bottom Side North Wall	SOIL	Volatile (gasoline range)	0.050	0.24	112
19365-006	0006 Soil Top Side of South Wall	SOIL	Volatile (gasoline range)	0.050	ND	75

[redacted]

[redacted]D - Not Detected
[redacted].L. - Detection Limit

@ - Diluted Out

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

Customer: O.H. MATERIALS CORPORATION
Source: N/A
Analysis: Gasoline
[redacted]d: Mod. EPA 8015
[redacted]otebook: 415, Pg. 44
Preparation Batch: GASS0719

Cust. Proj. No.: 15747
Project No.: 19365
Date Received: N/A
Date Analyzed: 07/19/94 - 07/20/94
Instrument Batch: BG0719

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	TPH	D.L. (mg/kg)	RESULT (mg/kg)	Bromofluorobenzene (% Recovery)
19365-005DUP	0005	SOIL	Volatile (gasoline range)	0.050	0.15	89
	Soil Bottom Side North Wall					
Blank	N/A	SOIL	Volatile (gasoline range)	0.05	ND	96

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY	QC LIMITS
LCSS	N/A	SOIL	0.50	0.54	108	50-150
19365-005MS	0005	SOIL	0.50	0.27	54	50-150
19365-005MSD	0005	SOIL	0.50	0.30	60	50-150

[redacted]

[redacted]

D - Not Detected
.L. - Detection Limit

@ - Diluted Out

ENVIRONMENTAL CHEMICAL CORPORATION

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Analysis: Diesel
[redacted]: EPA Mod. 8015
[redacted] Notebook: 377, Pg. 85
Preparation Batch: DZS0718

Cust. Proj. No.: 15747
Project No.: 19365
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Instrument Batch: DZ0719

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	TPH	D.L. (mg/kg)	RESULT (mg/kg)	Pentacosane (% Recovery)
19365-001	0001	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	37.0 (#)	95
	From Bottom of Tank 1 Soil					
19365-002	0002	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	471	118
	Soil From Bottom of Tank 2					
19365-003	0003	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	10.2	86
	Soil From West End of Excavati					
19365-004	0004	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	ND	86
	Soil From Bottom Side of South					
19365-005	0005	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	30.8 (#)	99
[redacted]	Soil Bottom Side North Wall					
19365-006	0006	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	ND	97
	Soil Top Side of South Wall					

[redacted] This sample contains a later eluting oil which was calculated as diesel.

[redacted]D - Not Detected
[redacted]L. - Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

Customer: O.H. MATERIALS CORPORATION
Source: N/A
Analysis: Diesel
[redacted]d: EPA Mod. 8015
[redacted]tebook: 377, Pg. 85
Preparation Batch: DZS0718

Cust. Proj. No.: 15747
Project No.: 19365
Date Received: N/A
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Instrument Batch: DZ0719

LAB I.D.	CUSTOMER SAMPLE NO.	MATRIX	TPH	D.L. (mg/kg)	RESULT (mg/kg)	Pentacosane (% Recovery)
19365-001DUP	0001 From Bottom of Tank 1 Soil	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	37.9 (#)	94
Blank	N/A	SOIL	NonVolatile (Diesel range) Range C15-C25	10.0	ND	85

			SPIKE mg/kg	RECOVERED mg/kg	% RECOVERY	QC LIMITS
LCSS	N/A	SOIL	50.0	49.4	99	50-150
19365-001MS	0001	SOIL	50.0	43.2	86	50-150
19365-001MSD	0001	SOIL	50.0	32.5	65	50-150

[redacted]

[redacted](#) This sample contains a later eluting oil which was calculated as diesel.

D - Not Detected
L. - Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0001

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: From Bottom of Tank 1 Soil
Analysis: VOLATILE EPA 8240

Matrix:(soil/water): SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-001
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap): Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 86

Date Analyzed: 07/20/94
Preparation Batch: VS0720-2
Instrument Batch: V0720-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	8.1	U	
2.	74-83-9	Bromomethane	3.9	U	
3.	75-01-4	Vinyl Chloride	4.2	U	
4.	75-00-3	Chloroethane	1.0	U	
5.	75-09-2	Methylene Chloride	3.4	U	
6.	67-64-1	Acetone	7.1	U	
7.	75-15-0	Carbon Disulfide	0.49	U	
8.	75-35-4	1,1-Dichloroethene	2.4	U	
9.	75-34-3	1,1-Dichloroethane	1.7	U	
10.	540-59-0	1,2-Dichloroethene	2.1	U	
11.	67-66-3	Chloroform	0.93	U	
12.	107-06-2	1,2-Dichloroethane	1.9	U	
13.	78-93-3	2-Butanone	5.9	U	
14.	71-55-6	1,1,1-Trichloroethane	1.8	U	
	56-23-5	Carbon Tetrachloride	1.1	U	
	75-27-4	Bromodichloromethane	0.84	U	
	78-87-5	1,2-Dichloropropane	3.1	U	
18.	10061-01-5	cis-1,3-Dichloropropene	3.4	U	
19.	79-01-6	Trichloroethene	2.0	U	
20.	124-48-1	Dibromochloromethane	7.4	U	
21.	79-00-5	1,1,2-Trichloroethane	0.47	U	
22.	71-43-2	Benzene	1.9	U	
23.	10061-02-6	trans-1,3-Dichloropropene	4.7	U	
24.	75-25-2	Bromoform	1.4	U	
25.	108-10-1	4-Methyl-2-Pentanone	3.8	U	
26.	591-78-6	2-Hexanone	5.1	U	
27.	127-18-4	Tetrachloroethene	1.9	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	2.2	U	
29.	108-88-3	Toluene	1.2	U	
30.	108-90-7	Chlorobenzene	1.5	U	
31.	100-41-4	Ethylbenzene	0.42	U	
32.	100-42-5	Styrene	2.0	U	
33.	1330-20-7	Xylene (total)	0.35	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	103	70-121	50.0
35.	Toluene-d8	100	81-117	50.0
36.	Bromofluorobenzene	97	74-121	50.0

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER

0001

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: From Bottom of Tank 1 Soil
Analysis: VOLATILE EPA 8240

Matrix:(soil/water) SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-001
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap) Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 86

Date Analyzed: 07/20/94
Preparation Batch: VS0720-2
Instrument Batch: V0720-2

TENTATIVELY IDENTIFIED COMPOUNDS

	CAS NO.	COMPOUND	RT/SCAN #	EST. CONC(µg/kg)
1.	115-10-6	ETHANOL	1.83	28

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0002

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil From Bottom of Tank 2
Analysis: VOLATILE EPA 8240

Matrix:(soil/water): SOIL
Sample Weight: 1.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-002
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap): Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 88

Date Analyzed: 07/21/94
Preparation Batch: VS0720-2
Instrument Batch: V0721-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	40.5	U	
2.	74-83-9	Bromomethane	19.5	U	
3.	75-01-4	Vinyl Chloride	21.0	U	
4.	75-00-3	Chloroethane	5.0	U	
5.	75-09-2	Methylene Chloride	17.0	U	
6.	67-64-1	Acetone	35.5	U	
7.	75-15-0	Carbon Disulfide	2.5	U	
8.	75-35-4	1,1-Dichloroethene	12.0	U	
9.	75-34-3	1,1-Dichloroethane	8.5	U	
10.	540-59-0	1,2-Dichloroethene	10.5	U	
11.	67-66-3	Chloroform	4.7	U	
12.	107-06-2	1,2-Dichloroethane	9.5	U	
13.	78-93-3	2-Butanone	29.5	U	
14.	71-55-6	1,1,1-Trichloroethane	9.0	U	
	56-23-5	Carbon Tetrachloride	5.5	U	
	75-27-4	Bromodichloromethane	4.2	U	
	78-87-5	1,2-Dichloropropane	15.5	U	
18.	10061-01-5	cis-1,3-Dichloropropene	17.0	U	
19.	79-01-6	Trichloroethene	10.0	U	
20.	124-48-1	Dibromochloromethane	37.0	U	
21.	79-00-5	1,1,2-Trichloroethane	2.4	U	
22.	71-43-2	Benzene	9.5	U	
23.	10061-02-6	trans-1,3-Dichloropropene	23.5	U	
24.	75-25-2	Bromoform	6.9	U	
25.	108-10-1	4-Methyl-2-Pentanone	19.0	U	
26.	591-78-6	2-Hexanone	25.5	U	
27.	127-18-4	Tetrachloroethene	9.5	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	11.0	U	
29.	108-88-3	Toluene	6.0	U	
30.	108-90-7	Chlorobenzene	7.5	U	
31.	100-41-4	Ethylbenzene	2.1	U	
32.	100-42-5	Styrene	10.0	U	
33.	1330-20-7	Xylene (total)	1.8	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	91	70-121	250
35.	Toluene-d8	103	81-117	250
36.	Bromofluorobenzene	117	74-121	250

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0002

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil From Bottom of Tank 2
Analysis: VOLATILE EPA 8240

Matrix:(soil/water) SOIL
Sample Weight: 1.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-002
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap) Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 88

Date Analyzed: 07/21/94
Preparation Batch: VS0720-2
Instrument Batch: V0721-2

TENTATIVELY IDENTIFIED COMPOUNDS

	CAS NO.	COMPOUND	RT/SCAN #	EST. CONC(µg/kg)
1.		C9H16	23.44	65
2.		C9H16	24.87	205
3.		C9H16	25.08	420
4.	3227-37-71	Pentalene, octahydro-1-methyl-	25.38	405
5.		C9H18	26.43	650
6.		C5H6S	27.54	25
7.	167-89-28	Cyclohexane, propyl-	29.11	1400
8.		C10H20	30.72	4950

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0003

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil From West End of Excavation
Analysis: VOLATILE EPA 8240

Matrix:(soil/water) SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-003
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap) Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 88

Date Analyzed: 07/21/94
Preparation Batch: VS0720-2
Instrument Batch: V0721-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	8.1	U	
2.	74-83-9	Bromomethane	3.9	U	
3.	75-01-4	Vinyl Chloride	4.2	U	
4.	75-00-3	Chloroethane	1.0	U	
5.	75-09-2	Methylene Chloride	3.4	U	
6.	67-64-1	Acetone	7.1	U	
7.	75-15-0	Carbon Disulfide	0.49	U	
8.	75-35-4	1,1-Dichloroethene	2.4	U	
9.	75-34-3	1,1-Dichloroethane	1.7	U	
10.	540-59-0	1,2-Dichloroethene	2.1	U	
11.	67-66-3	Chloroform	0.93	U	
12.	107-06-2	1,2-Dichloroethane	1.9	U	
13.	78-93-3	2-Butanone	5.9	U	
14.	71-55-6	1,1,1-Trichloroethane	1.8	U	
15.	56-23-5	Carbon Tetrachloride	1.1	U	
16.	75-27-4	Bromodichloromethane	0.84	U	
17.	78-87-5	1,2-Dichloropropane	3.1	U	
18.	10061-01-5	cis-1,3-Dichloropropene	3.4	U	
19.	79-01-6	Trichloroethene	2.0	U	
20.	124-48-1	Dibromochloromethane	7.4	U	
21.	79-00-5	1,1,2-Trichloroethane	0.47	U	
22.	71-43-2	Benzene	1.9	U	
23.	10061-02-6	trans-1,3-Dichloropropene	4.7	U	
24.	75-25-2	Bromoform	1.4	U	
25.	108-10-1	4-Methyl-2-Pentanone	3.8	U	
26.	591-78-6	2-Hexanone	5.1	U	
27.	127-18-4	Tetrachloroethene	1.9	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	2.2	U	
29.	108-88-3	Toluene	1.2	15.3	
30.	108-90-7	Chlorobenzene	1.5	U	
31.	100-41-4	Ethylbenzene	0.42	U	
32.	100-42-5	Styrene	2.0	U	
33.	1330-20-7	Xylene (total)	0.35	6.7	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	91	70-121	50.0
35.	Toluene-d8	108	81-117	50.0
36.	Bromofluorobenzene	94	74-121	50.0

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0004

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil From Bottom Side of South Wall
Analysis: VOLATILE EPA 8240

Matrix:(soil/water): SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-004
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap): Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 88

Date Analyzed: 07/21/94
Preparation Batch: VS0720-2
Instrument Batch: V0721-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	8.1	U	
2.	74-83-9	Bromomethane	3.9	U	
3.	75-01-4	Vinyl Chloride	4.2	U	
4.	75-00-3	Chloroethane	1.0	U	
5.	75-09-2	Methylene Chloride	3.4	U	
6.	67-64-1	Acetone	7.1	U	
7.	75-15-0	Carbon Disulfide	0.49	U	
8.	75-35-4	1,1-Dichloroethene	2.4	U	
9.	75-34-3	1,1-Dichloroethane	1.7	U	
10.	540-59-0	1,2-Dichloroethene	2.1	U	
11.	67-66-3	Chloroform	0.93	U	
12.	107-06-2	1,2-Dichloroethane	1.9	U	
13.	78-93-3	2-Butanone	5.9	U	
14.	71-55-6	1,1,1-Trichloroethane	1.8	U	
15.	56-23-5	Carbon Tetrachloride	1.1	U	
16.	75-27-4	Bromodichloromethane	0.84	U	
17.	78-87-5	1,2-Dichloropropane	3.1	U	
18.	10061-01-5	cis-1,3-Dichloropropene	3.4	U	
19.	79-01-6	Trichloroethene	2.0	U	
20.	124-48-1	Dibromochloromethane	7.4	U	
21.	79-00-5	1,1,2-Trichloroethane	0.47	U	
22.	71-43-2	Benzene	1.9	U	
23.	10061-02-6	trans-1,3-Dichloropropene	4.7	U	
24.	75-25-2	Bromoform	1.4	U	
25.	108-10-1	4-Methyl-2-Pentanone	3.8	U	
26.	591-78-6	2-Hexanone	5.1	U	
27.	127-18-4	Tetrachloroethene	1.9	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	2.2	U	
29.	108-88-3	Toluene	1.2	U	
30.	108-90-7	Chlorobenzene	1.5	U	
31.	100-41-4	Ethylbenzene	0.42	U	
32.	100-42-5	Styrene	2.0	U	
33.	1330-20-7	Xylene (total)	0.35	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	94	70-121	50.0
35.	Toluene-d8	100	81-117	50.0
36.	Bromofluorobenzene	102	74-121	50.0

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0005

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil Bottom Side North Wall
Analysis: VOLATILE EPA 8240

Matrix:(soil/water) SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-005
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap) Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 88

Date Analyzed: 07/21/94
Preparation Batch: VS0720-2
Instrument Batch: V0721-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	8.1	U	
2.	74-83-9	Bromomethane	3.9	U	
3.	75-01-4	Vinyl Chloride	4.2	U	
4.	75-00-3	Chloroethane	1.0	U	
5.	75-09-2	Methylene Chloride	3.4	U	
6.	67-64-1	Acetone	7.1	U	
7.	75-15-0	Carbon Disulfide	0.49	U	
8.	75-35-4	1,1-Dichloroethene	2.4	U	
9.	75-34-3	1,1-Dichloroethane	1.7	U	
10.	540-59-0	1,2-Dichloroethene	2.1	U	
11.	67-66-3	Chloroform	0.93	U	
12.	107-06-2	1,2-Dichloroethane	1.9	U	
13.	78-93-3	2-Butanone	5.9	U	
14.	71-55-6	1,1,1-Trichloroethane	1.8	U	
[redacted]	56-23-5	Carbon Tetrachloride	1.1	U	
[redacted]	75-27-4	Bromodichloromethane	0.84	U	
[redacted]	78-87-5	1,2-Dichloropropane	3.1	U	
18.	10061-01-5	cis-1,3-Dichloropropene	3.4	U	
19.	79-01-6	Trichloroethene	2.0	U	
20.	124-48-1	Dibromochloromethane	7.4	U	
21.	79-00-5	1,1,2-Trichloroethane	0.47	U	
22.	71-43-2	Benzene	1.9	U	
23.	10061-02-6	trans-1,3-Dichloropropene	4.7	U	
24.	75-25-2	Bromoform	1.4	U	
25.	108-10-1	4-Methyl-2-Pentanone	3.8	U	
26.	591-78-6	2-Hexanone	5.1	U	
27.	127-18-4	Tetrachloroethene	1.9	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	2.2	U	
29.	108-88-3	Toluene	1.2	U	
30.	108-90-7	Chlorobenzene	1.5	U	
31.	100-41-4	Ethylbenzene	0.42	U	
32.	100-42-5	Styrene	2.0	U	
33.	1330-20-7	Xylene (total)	0.35	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	95	70-121	50.0
35.	Toluene-d8	100	81-117	50.0
36.	Bromofluorobenzene	103	74-121	50.0

[redacted] U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0006

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil Top Side of South Wall
Analysis: VOLATILE EPA 8240

Matrix:(soil/water): SOIL
Sample Weight: 5.0 g
Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-006
Date Sampled: 07/14/94
Date Received: 07/16/94

Column:(packed/cap): Packed
Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 414, Pg. 86

Date Analyzed: 07/20/94
Preparation Batch: VS0720-2
Instrument Batch: V0720-2

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	74-87-3	Chloromethane	8.1	U	
2.	74-83-9	Bromomethane	3.9	U	
3.	75-01-4	Vinyl Chloride	4.2	U	
4.	75-00-3	Chloroethane	1.0	U	
5.	75-09-2	Methylene Chloride	3.4	U	
6.	67-64-1	Acetone	7.1	U	
7.	75-15-0	Carbon Disulfide	0.49	U	
8.	75-35-4	1,1-Dichloroethene	2.4	U	
9.	75-34-3	1,1-Dichloroethane	1.7	U	
10.	540-59-0	1,2-Dichloroethene	2.1	U	
11.	67-66-3	Chloroform	0.93	U	
12.	107-06-2	1,2-Dichloroethane	1.9	U	
13.	78-93-3	2-Butanone	5.9	U	
14.	71-55-6	1,1,1-Trichloroethane	1.8	U	
	56-23-5	Carbon Tetrachloride	1.1	U	
	75-27-4	Bromodichloromethane	0.84	U	
17.	78-87-5	1,2-Dichloropropane	3.1	U	
18.	10061-01-5	cis-1,3-Dichloropropene	3.4	U	
19.	79-01-6	Trichloroethene	2.0	U	
20.	124-48-1	Dibromochloromethane	7.4	U	
21.	79-00-5	1,1,2-Trichloroethane	0.47	U	
22.	71-43-2	Benzene	1.9	U	
23.	10061-02-6	trans-1,3-Dichloropropene	4.7	U	
24.	75-25-2	Bromoform	1.4	U	
25.	108-10-1	4-Methyl-2-Pentanone	3.8	U	
26.	591-78-6	2-Hexanone	5.1	U	
27.	127-18-4	Tetrachloroethene	1.9	U	
28.	79-34-5	1,1,2,2-Tetrachloroethane	2.2	U	
29.	108-88-3	Toluene	1.2	U	
30.	108-90-7	Chlorobenzene	1.5	U	
31.	100-41-4	Ethylbenzene	0.42	U	
32.	100-42-5	Styrene	2.0	U	
33.	1330-20-7	Xylene (total)	0.35	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
34.	1,2-Dichloroethane-d4	102	70-121	50.0
35.	Toluene-d8	103	81-117	50.0
36.	Bromofluorobenzene	94	74-121	50.0

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

N/A

Customer: O.H. MATERIALS CORPORATION

[redacted]ce: Fort Riley, KS (TANKS)

[redacted]tion: N/A

Cust. Proj. No.: 15747

Analysis: VOLATILE EPA 8240

Matrix:(soil/water) Soil

Sample Weight: 5.0 g

Extract Volume: 5.0 mL

Lab Sample I.D.: BLANK

Date Sampled: N/A

Date Received: N/A

Column:(packed/cap) Packed

Percent Solid: 100 %

Dilution Factor: 1

Lab Notebook No: 414, Pg. 86

Date Analyzed: 07/20/94

Preparation Batch: VS0720-2

Instrument Batch: V0720-2

BLANK

CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG

ALL COMPOUNDS ARE BELOW DETECTION LIMIT.

SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
1,2-Dichloroethane-d4	96	70-121	50.0
Toluene-d8	100	81-117	50.0
Bromofluorobenzene	102	74-121	50.0

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

0006

Customer: O.H. MATERIALS CORPORATION

Source: Fort Riley, KS (TANKS)

Cust. Proj. No.: 15747

Location: Soil Top Side of South Wall

Analysis: VOLATILE EPA 8240

Matrix:(soil/water) SOIL

Sample Weight: 5.0 g

Extract Volume: 5.0 mL

Lab Sample I.D.: 19365-006 Duplicate

Date Sampled: 07/14/94

Date Received: 07/16/94

Column:(packed/cap) Packed

Percent Solid: 100 %

Dilution Factor: 1

Lab Notebook No: 414, Pg. 86

Date Analyzed: 07/20/94

Preparation Batch: VS0720-2

Instrument Batch: V0720-2

DUPLICATE

COMPOUND	DETECTION LIMIT (µg/kg)	SAMPLE RESULT (µg/kg)	DUPLICATE RESULT (µg/kg)	FLAG

ALL COMPOUNDS ARE BELOW DETECTION LIMIT.

SURROGATE STANDARD	SAMPLE RECOVERY (%)	DUPLICATE RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
1,2-Dichloroethane-d4	102	105	70-121	50.0
Toluene-d8	103	102	81-117	50.0
Bromofluorobenzene	94	96	74-121	50.0

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER: N/A

Customer: O.H. MATERIALS CORPORATION

Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747

[redacted]: N/A

Analysis: VOLATILE EPA 8240

Matrix: (soil/water) Soil Lab Sample I.D.: 19365-LCSS

Preparation Batch: VS0720-2 Instrument Batch: V0720-2

LABORATORY CONTROL SAMPLE

COMPOUND		TRUE VALUE (µg/kg)	FOUND (µg/kg)	% REC #	QC LIMITS % REC.
1,1-Dichloroethene		50.0	60.7	121	59-172
Trichloroethene		50.0	48.7	97	62-137
Benzene		50.0	49.1	98	66-142
Toluene		50.0	50.6	101	59-139
Chlorobenzene		50.0	48.6	97	60-133

Column to be used to flag recovery values with an asterisk

Values outside of QC limits

Spike Recovery: 0 out of 5 outside limits

[redacted]TS:

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

0006

Customer: O.H. MATERIALS CORPORATION

Fort Riley, KS (TANKS) Cust. Proj. No.: 15747

Location: Soil Top Side of South Wall

Analysis: VOLATILE EPA 8240

Matrix: (soil/water) SOIL Lab Sample I.D.: 19365-006

Preparation Batch: VS0720-2 **Instrument Batch:** V0720-2

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

COMPOUND	SPIKE ADDED (µg/kg)	SAMPLE CONC. (µg/kg)	MS CONC. (µg/kg)	% REC #	QC LIMITS % REC.
1,1-Dichloroethene	50.0	0.0	78.4	157	59-172
Trichloroethene	50.0	0.0	60.7	121	62-137
Benzene	50.0	0.0	62.5	125	66-142
Toluene	50.0	0.0	64.7	129	59-139
Chlorobenzene	50.0	0.0	62.2	124	60-133

COMPOUND	SPIKE ADDED (µg/kg)	MSD CONC. (µg/kg)	MSD % REC	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50.0	72.2	144	9	22	59-172
Trichloroethene	50.0	58.0	116	4	24	62-137
Benzene	50.0	59.7	119	5	21	66-142
Toluene	50.0	62.2	124	4	21	59-139
Chlorobenzene	50.0	60.4	121	2	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

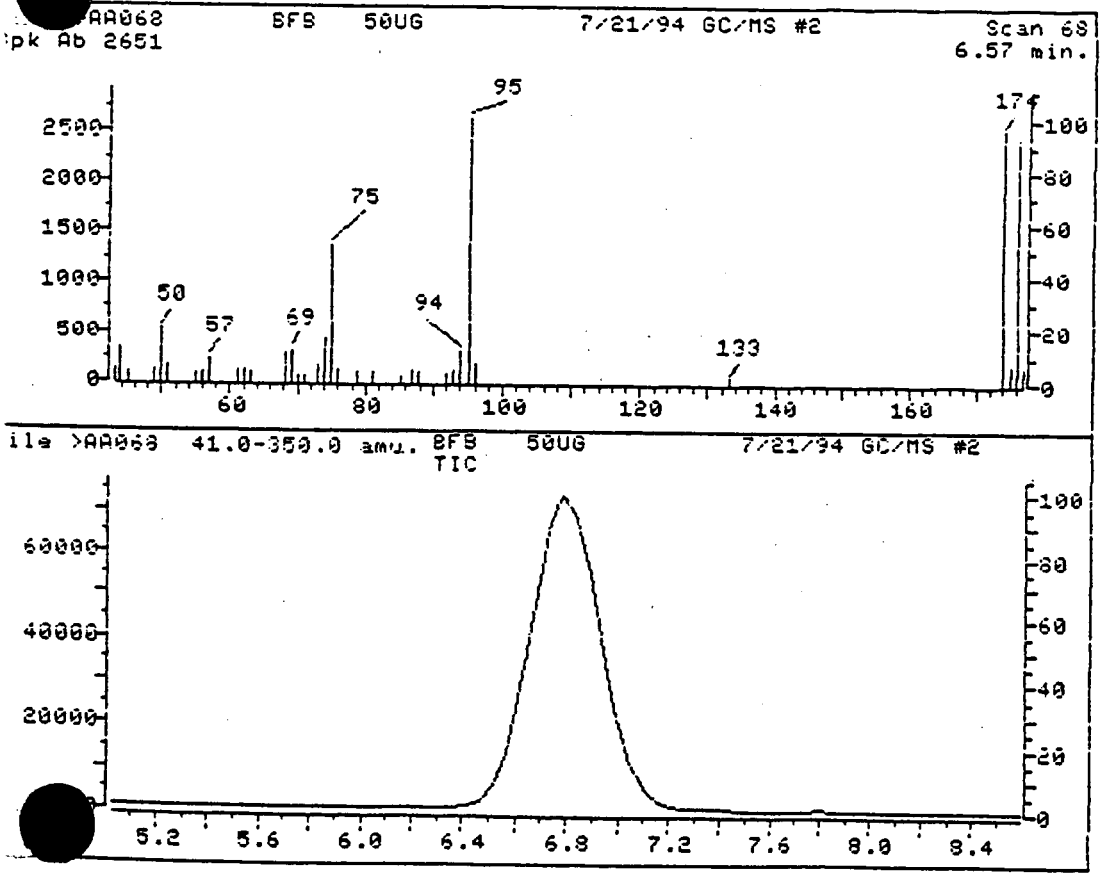
COMMENTS:

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	20.07	20.07	Ok
75	30-60% of mass 95	51.64	51.64	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.87	6.87	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.04	96.04	Ok
175	5-9% of mass 174	6.79	7.07	Ok
176	95-101% of mass 174	93.36	97.21	Ok
177	5-9% of mass 176	6.22	6.67	Ok

Injection Date: 07/21/94
Injection Time: 08:44
Data File: >AA068
Scan: 68



7/21/94

VS0720-2
V0721-2

Continuing Calibration Check
HSL Compounds

[redacted] No: _____ Calibration Date: 07/21/94

Contractor: ECC GC/MS #2 8240 Time: 09:12

Contract No: Laboratory ID: >JUL21

Instrument ID: 2716A10254 Initial Calibration Date: 05/27/94

Minimum $\overline{RF}$ for SPCC is 0.300 Maximum % Diff for CCC is 25%%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
Chloromethane	.51376	.31419	38.85		**	
Dichlorodifluoromethane	1.61475	.28591	82.29			
Bromomethane	.65576	.50504	22.98			
Vinyl Chloride	.56230	.45887	18.40	*		
Chloroethane	.37407	.39621	5.92			
Methylene Chloride	1.15125	1.67830	45.78			
Acrylonitrile	.11643	.19179	64.73			
Acetone	.25509	.29719	16.51			
Carbon Disulfide	3.13453	2.77890	11.35			
Trichlorofluoromethane	3.12079	2.41212	22.71			
1,1-Dichloroethene	1.71316	1.86797	9.04	*		
[redacted]ichloroethane	1.96214	2.25325	14.84		**	
[redacted]chloroethene	1.68183	1.80818	7.51			
[redacted]oform	3.03477	3.20779	5.70	*		
1,2-Dichloroethane-d4	1.96996	1.72346	12.51			
1,2-Dichloroethane	1.94169	1.94743	.30			
Dibromomethane	.54366	.56475	3.88			
2-Butanone	.08958	.08580	4.23			
1,1,1-Trichloroethane	.93219	.80469	13.68			
Carbon Tetrachloride	.90401	.76458	15.42			
Vinyl Acetate	.11185	.17664	57.92			
Bromodichloromethane	.95024	.90033	5.25			
1,2-Dichloropropane	.30997	.35652	15.02	*		
cis-1,3-Dichloropropene	.50554	.44262	12.45			(Conc=53.00)
Trichloroethene	.50969	.49842	2.21			
Dibromochloromethane	.55530	.62206	12.02			
1,1,2-Trichloroethane	.30081	.37403	24.34			
Benzene	.73344	.78292	6.75			
trans-1,3-Dichloropropene	.38186	.42284	10.73			(Conc=47.00)
2-Chloroethylvinylether	.11143	.15135	35.82			
1,2-dibromoethane	-	-	-			(Conc=50.00)
Bromoform	.42546	.45131	6.08		**	

RF - Response Factor from daily standard file at 50.00 ug/L

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI

[redacted] - % Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check
HSL Compounds

[redacted]o: Calibration Date: 07/21/94

Contractor: ECC GC/MS #2 8240 Time: 09:12

Contract No: Laboratory ID: >JUL21

Instrument ID: 2716A10254 Initial Calibration Date: 05/27/94

Minimum $\overline{RF}$ for SPCC is 0.300 Maximum % Diff for CCC is 25%%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC
4-Methyl-2-Pentanone	.27445	.29223	6.48		
1,2,3 Trichloropropane	.51593	.74589	44.57		
2-Hexanone	.18068	.19589	8.42		
Tetrachloroethene	.63846	.54054	15.34		
1,1,2,2-Tetrachloroethane	.65122	.85810	31.77		**
Toluene	1.07761	1.05592	2.01	*	
Toluene-d8	1.20410	1.05839	12.10		
Chlorobenzene	.95221	1.00976	6.04		**
Ethylbenzene	1.31707	1.32547	.64	*	
Bromofluorobenzene	.92379	.95332	3.20		(Conc=50.00)
Styrene	.91649	.89719	2.11		
X[redacted] (total)	1.28397	1.26074	1.81		(Conc=150.00)
[redacted]hlorobenzene	1.14532	1.27962	11.73		
1,2 [redacted]ichlorobenzene	1.16624	1.42723	22.38		
1,4-Dichlorobenzene	1.05814	1.34905	27.49		

F - Response Factor from daily standard file at 50.00 ug/L

$\overline{F}$ - Average Response Factor from Initial Calibration Form VI

[redacted] % Difference from original average or curve

CC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

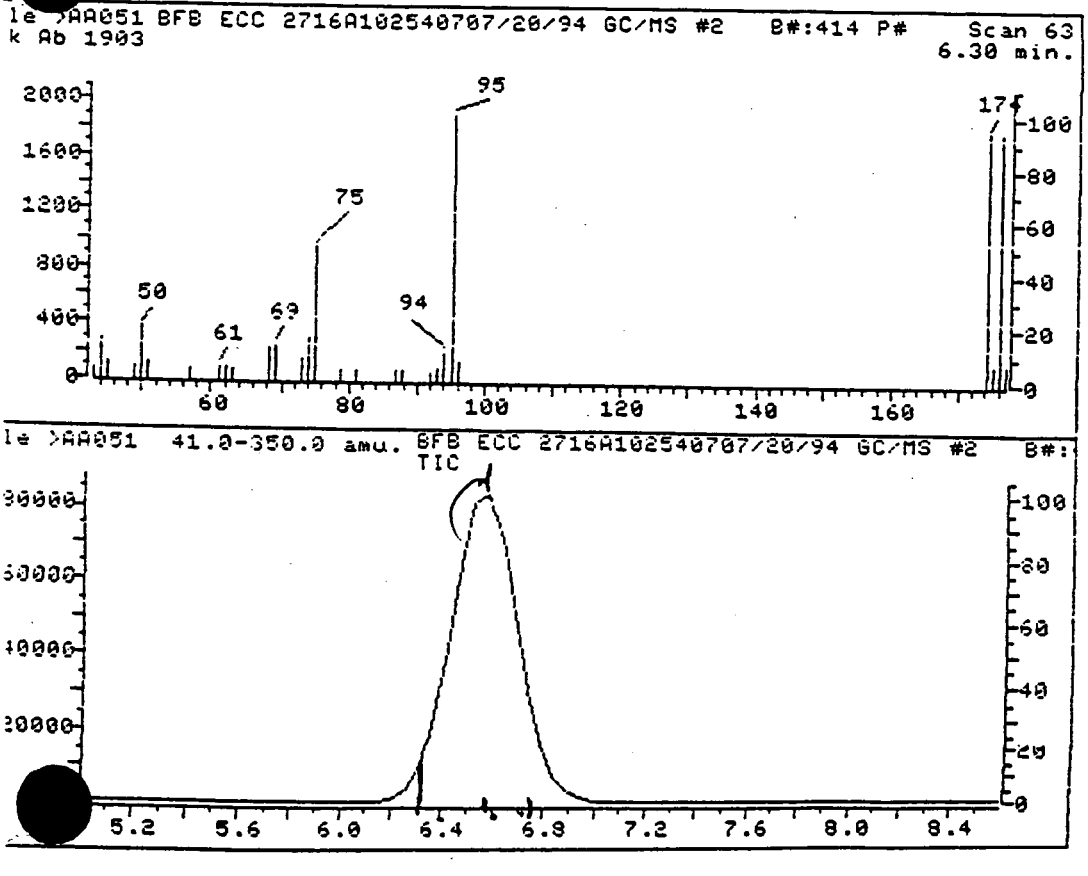
GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.29	19.29	Ok
75	30-60% of mass 95	49.92	49.92	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.41	7.41	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	94.48	94.48	Ok
175	5-9% of mass 174	7.04	7.45	Ok
176	95-101% of mass 174	93.96	99.44	Ok
177	5-9% of mass 176	7.15	7.61	Ok

Injection Date: 07/20/94
Injection Time: 10:57
Data File: >AA051
Scan: 63

good
7/20/94



VS0720-2

V0720-2

Continuing Calibration Check
HSL Compounds

Case No: [redacted]

Calibration Date: 07/20/94

Contractor: ECC GC/MS #2 8240

Time: 11:22

Contract No:

Laboratory ID: >JUC20

Instrument ID: 2716A10254

Initial Calibration Date: 05/27/94

Minimum $\overline{RF}$ for SPCC is 0.300

Maximum % Diff for CCC is 25%%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
hloromethane	.51376	.59319	15.46		**	
ichlorodifluoromethane	1.61475	1.56497	3.08			
romomethane	.65576	.57232	12.72			
inyl Chloride	.56230	.65775	16.97	*		
hloroethane	.37407	.44422	18.75			
ethylene Chloride	1.15125	1.42578	23.85			
crylonitrile	.11643	.16266	39.71			
cetone	.25509	.25422	.34			
rbon Disulfide	3.13453	2.26578	27.72			
ichlorofluoromethane	3.12079	2.39773	23.17			
[redacted]loroethene	1.71316	1.46085	14.73	*		
[redacted]loroethane	1.96214	1.84002	6.22		**	
2-Dichloroethene	1.68183	1.48747	11.56			
loroform	3.03477	2.65053	12.66	*		
2-Dichloroethane-d4	1.96996	1.55727	20.95			
2-Dichloroethane	1.94169	1.66065	14.47			
bromomethane	.54366	.51613	5.06			
Butanone	.08958	.06646	25.81			
1,1-Trichloroethane	.93219	.75243	19.28			
rbon Tetrachloride	.90401	.72546	19.75			
nyl Acetate	.11185	.16947	51.51			
omodichloromethane	.95024	.85576	9.94			
2-Dichloropropane	.30997	.32695	5.48	*		
s-1,3-Dichloropropene	.50554	.39647	21.57			(Conc=53.00)
ichloroethene	.50969	.45985	9.78			
bromochloromethane	.55530	.55780	.45			
1,2-Trichloroethane	.30081	.33547	11.52			
nzene	.73344	.72117	1.67			
ans-1,3-Dichloropropene	.38186	.39695	3.95			(Conc=47.00)
Chloroethylvinylether	.11143	.13664	22.62			
2-dibromoethane	-	-	-			(Conc=50.00)
omoform	.42546	.43665	2.63		**	

- Response Factor from daily standard file at 50.00 ug/L

[redacted]Average Response Factor from Initial Calibration Form VI

iff - % Difference from original average or curve

- Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check
HSL Compounds

[redacted]o: Calibration Date: 07/20/94

Contractor: ECC GC/MS #2 8240 Time: 11:22

Contract No: Laboratory ID: >JUC20

Instrument ID: 2716A10254 Initial Calibration Date: 05/27/94

Minimum $\overline{RF}$ for SPCC is 0.300 Maximum % Diff for CCC is 25%%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
4-Methyl-2-Pentanone	.27445	.26295	4.19			
1,2,3 Trichloropropane	.51593	.71622	38.82			
2-Hexanone	.18068	.17245	4.55			
Tetrachloroethene	.63846	.49197	22.94			
1,1,2,2-Tetrachloroethane	.65122	.81133	24.59		**	
Toluene	1.07761	.94970	11.87	*		
Toluene-d8	1.20410	1.03359	14.16			
Chlorobenzene	.95221	.91766	3.63		**	
Ethylbenzene	1.31707	1.21169	8.00	*		
Bromofluorobenzene	.92379	.96749	4.73			(Conc=50.00)
Styrene	.91649	.85228	7.01			
[redacted](total)	1.28397	1.17296	8.65			(Conc=150.00)
[redacted]hlorobenzene	1.14532	1.25693	9.75			
1,2-Dichlorobenzene	1.16624	1.40734	20.67			
1,4-Dichlorobenzene	1.05814	1.12541	6.36			

7/20/94

F - Response Factor from daily standard file at 50.00 ug/L

[redacted] Average Response Factor from Initial Calibration Form VI

[redacted] % Difference from original average or curve

CC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0001

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Location: From Bottom of Tank 1 Soil
Analysis: SEMIVOLATILE EPA 8270
Cust. Proj. No.: 15747

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-001
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
13.	98-95-3	Nitrobenzene	126	U	
	78-59-1	Isophorone	161	U	
	88-75-5	2-Nitrophenol	139	U	
	105-67-9	2,4-Dimethylphenol	71.6	U	
17.	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
41.	86-73-7	Fluorene	89.5	U	
	100-01-6	4-Nitroaniline	405	U	
	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0001

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: From Bottom of Tank 1 Soil
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water)	SOIL	Lab Sample I.D.:	19365-001
Sample Weight:	10.0 g	Date Sampled:	07/14/94
Extract Volume:	1.0 mL	Date Received:	07/16/94
Injection Volume:	1 uL	Date Extracted:	07/18/94
		Date Analyzed:	07/19/94
Percent Solid:	100 %	**Preparation Batch:**	BNAS0718
Dilution Factor:	1	**Instrument Batch:**	B0719-1
Lab Notebook No:	402, Pg. 97		

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	428	
59.	117-84-0	Di-n-octylphthalate	204	U	
60.	205-99-2	Benzo(b)fluoranthene	403	U	
61.	207-08-9	Benzo(k)fluoranthene	506	U	
62.	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	75	25-121	20000
67.	Phenol-d5	92	24-113	20000
68.	Nitrobenzene-d5	67	23-120	10000
69.	2-Fluorobiphenyl	76	30-115	10000
70.	Terphenyl-d14	85	18-137	10000
71.	2,4,6-Tribromophenol	88	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0002

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Location: Soil From Bottom of Tank 2
Analysis: SEMIVOLATILE EPA 8270

Cust. Proj. No.: 15747

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-002
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
13.	98-95-3	Nitrobenzene	126	U	
	78-59-1	Isophorone	161	U	
	88-75-5	2-Nitrophenol	139	U	
	105-67-9	2,4-Dimethylphenol	71.6	U	
17.	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
41.	86-73-7	Fluorene	89.5	U	
	100-01-6	4-Nitroaniline	405	U	
	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
44.	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0002

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Location: Soil From Bottom of Tank 2
Analysis: SEMIVOLATILE EPA 8270

Cust. Proj. No.: 15747

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-002
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	1160	
59.	117-84-0	Di-n-octylphthalate	204	U	
	205-99-2	Benzo(b)fluoranthene	403	U	
	207-08-9	Benzo(k)fluoranthene	506	U	
	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	92	25-121	20000
67.	Phenol-d5	94	24-113	20000
68.	Nitrobenzene-d5	50	23-120	10000
69.	2-Fluorobiphenyl	61	30-115	10000
70.	Terphenyl-d14	72	18-137	10000
71.	2,4,6-Tribromophenol	76	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0002

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil From Bottom of Tank 2
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-002
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

TENTATIVELY IDENTIFIED COMPOUNDS

	CAS NO.	COMPOUND	RT/SCAN #	EST. CONC(µg/kg)
1.	7667552	Cyclohexane, 1,2,3-trimethyl-, (1.alpha.,2.alpha.,3.beta.)-	8.09	1300
2.	4926903	Cyclohexane, 1-ethyl-1-methyl-	8.21	1100
3.	4926787	Cyclohexane, 1-ethyl-4-methyl-, cis-	8.32	1500
4.		C7H14	8.54	1100
5.		DIMETHYL-3,5 HEPTENE-3	8.82	3100
6.		C9H16	9.26	2800
7.	2051301	Octane, 2,6-dimethyl-	9.70	8100
8.	52896874	Heptane, 4-(1-methylethyl)-	9.87	6100
9.	15869860	Octane, 4-ethyl-	10.25	3700
10.		C10H20	10.41	6100
11.	2847725	Decane, 4-methyl-	11.87	7300
12.		C8H16O	11.93	1400
		C9H16O	12.10	2600
		C9H11Cl	12.33	2100
15.	1074437	Benzene, 1-methyl-3-propyl-	12.41	1900
16.		C11H24	12.49	2200
17.	2847725	Decane, 4-methyl-	12.56	1600
18.		C10H18	12.61	2800
19.		C11H16	13.26	1800
20.	934747	Benzene, 1-ethyl-3,5-dimethyl-	14.04	3100

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0003

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil From West End of Excavation
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-003
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
[redacted]	98-95-3	Nitrobenzene	126	U	
[redacted]	78-59-1	Isophorone	161	U	
[redacted]	88-75-5	2-Nitrophenol	139	U	
16.	105-67-9	2,4-Dimethylphenol	71.6	U	
17.	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
[redacted]	86-73-7	Fluorene	89.5	U	
[redacted]	100-01-6	4-Nitroaniline	405	U	
43.	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
44.	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0003

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747
Location: Soil From West End of Excavation
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-003
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	1080	
59.	117-84-0	Di-n-octylphthalate	204	U	
60.	205-99-2	Benzo(b)fluoranthene	403	U	
61.	207-08-9	Benzo(k)fluoranthene	506	U	
62.	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	76	25-121	20000
67.	Phenol-d5	92	24-113	20000
68.	Nitrobenzene-d5	62	23-120	10000
69.	2-Fluorobiphenyl	73	30-115	10000
70.	Terphenyl-d14	80	18-137	10000
71.	2,4,6-Tribromophenol	83	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0004

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil From Bottom Side of South Wall
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-004
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
13.	98-95-3	Nitrobenzene	126	U	
[redacted]	78-59-1	Isophorone	161	U	
[redacted]	88-75-5	2-Nitrophenol	139	U	
[redacted]	105-67-9	2,4-Dimethylphenol	71.6	U	
17.	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
41.	86-73-7	Fluorene	89.5	U	
[redacted]	100-01-6	4-Nitroaniline	405	U	
[redacted]	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
44.	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0004

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil From Bottom Side of South Wall
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-004
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	440	
59.	117-84-0	Di-n-octylphthalate	204	U	
60.	205-99-2	Benzo(b)fluoranthene	403	U	
61.	207-08-9	Benzo(k)fluoranthene	506	U	
62.	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	76	25-121	20000
67.	Phenol-d5	92	24-113	20000
68.	Nitrobenzene-d5	62	23-120	10000
69.	2-Fluorobiphenyl	65	30-115	10000
70.	Terphenyl-d14	72	18-137	10000
71.	2,4,6-Tribromophenol	85	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0005

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Location: Soil Bottom Side North Wall
Analysis: SEMIVOLATILE EPA 8270

Cust. Proj. No.: 15747

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-005
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
13.	98-95-3	Nitrobenzene	126	U	
	78-59-1	Isophorone	161	U	
	88-75-5	2-Nitrophenol	139	U	
16.	105-67-9	2,4-Dimethylphenol	71.6	U	
17.	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
41.	86-73-7	Fluorene	89.5	U	
	100-01-6	4-Nitroaniline	405	U	
	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
44.	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0005

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil Bottom Side North Wall
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-005
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	4610	
59.	117-84-0	Di-n-octylphthalate	204	U	
	205-99-2	Benzo(b)fluoranthene	403	U	
	207-08-9	Benzo(k)fluoranthene	506	U	
62.	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	78	25-121	20000
67.	Phenol-d5	91	24-113	20000
68.	Nitrobenzene-d5	67	23-120	10000
69.	2-Fluorobiphenyl	76	30-115	10000
70.	Terphenyl-d14	94	18-137	10000
71.	2,4,6-Tribromophenol	94	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0006

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil Top Side of South Wall
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-006
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
1.	108-95-2	Phenol	122	U	
2.	111-44-4	bis(2-Chloroethyl)Ether	159	U	
3.	95-57-8	2-Chlorophenol	73.6	U	
4.	541-73-1	1,3-Dichlorobenzene	98.0	U	
5.	106-46-7	1,4-Dichlorobenzene	107	U	
6.	100-51-6	Benzyl Alcohol	205	U	
7.	95-50-1	1,2-Dichlorobenzene	111	U	
8.	95-48-7	2-Methylphenol	213	U	
9.	108-60-1	bis(2-chloroisopropyl)ether	189	U	
10.	106-44-5	4-Methylphenol	212	U	
11.	621-64-7	N-Nitroso-Di-n-propylamine	192	U	
12.	67-72-1	Hexachloroethane	88.4	U	
13.	98-95-3	Nitrobenzene	126	U	
14.	78-59-1	Isophorone	161	U	
	88-75-5	2-Nitrophenol	139	U	
	105-67-9	2,4-Dimethylphenol	71.6	U	
	111-91-1	bis(2-Chloroethoxy)methane	138	U	
18.	120-83-2	2,4-Dichlorophenol	94.5	U	
19.	120-82-1	1,2,4-Trichlorobenzene	138	U	
20.	91-20-3	Naphthalene	108	U	
21.	106-47-8	4-Chloroaniline	173	U	
22.	87-68-3	Hexachlorobutadiene	129	U	
23.	59-50-7	4-Chloro-3-methylphenol	183	U	
24.	91-57-6	2-Methylnaphthalene	154	U	
25.	77-47-4	Hexachlorocyclopentadiene	127	U	
26.	88-06-2	2,4,6-Trichlorophenol	91.8	U	
27.	95-95-4	2,4,5-Trichlorophenol	95.0	U	
28.	91-58-7	2-Chloronaphthalene	105	U	
29.	88-74-4	2-Nitroaniline	243	U	
30.	131-11-3	Dimethylphthalate	126	U	
31.	208-96-8	Acenaphthylene	108	U	
32.	606-20-2	2,6-Dinitrotoluene	96.9	U	
33.	99-09-2	3-Nitroaniline	368	U	
34.	83-32-9	Acenaphthene	58.0	U	
35.	51-28-5	2,4-Dinitrophenol	263	U	
36.	100-02-7	4-Nitrophenol	240	U	
37.	132-64-9	Dibenzofuran	131	U	
38.	121-14-2	2,4-Dinitrotoluene	98.8	U	
39.	84-66-2	Diethylphthalate	132	U	
40.	7005-72-3	4-Chlorophenyl-phenylether	134	U	
41.	86-73-7	Fluorene	89.5	U	
42.	100-01-6	4-Nitroaniline	405	U	
	534-52-1	4,6-Dinitro-2-methylphenol	102	U	
	86-30-6	N-Nitrosodiphenylamine (1)	75.8	U	
45.	101-55-3	4-Bromophenyl-phenylether	62.1	U	
46.	118-74-1	Hexachlorobenzene	133	U	

(1) - Cannot be separated from Diphenylamine

ENVIRONMENTAL CHEMICAL CORPORATION

SAMPLE NUMBER: 0006

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Location: Soil Top Side of South Wall
Analysis: SEMIVOLATILE EPA 8270

Cust. Proj. No.: 15747

Matrix:(soil/water): SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 uL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402, Pg. 97

Lab Sample I.D.: 19365-006
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

SAMPLE RESULTS

	CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG
47.	87-86-5	Pentachlorophenol	429	U	
48.	85-01-8	Phenanthrene	68.2	U	
49.	120-12-7	Anthracene	88.3	U	
50.	86-74-8	Carbazole	89.1	U	
51.	84-74-2	Di-n-butylphthalate	149	U	
52.	206-44-0	Fluoranthene	94.2	U	
53.	129-00-0	Pyrene	201	U	
54.	85-68-7	Butylbenzylphthalate	147	U	
55.	91-94-1	3,3'-Dichlorobenzidine	552	U	
56.	56-55-3	Benzo(a)anthracene	122	U	
57.	218-01-9	Chrysene	134	U	
58.	117-81-7	bis(2-Ethylhexyl)phthalate	306	2270	
59.	117-84-0	Di-n-octylphthalate	204	U	
	205-99-2	Benzo(b)fluoranthene	403	U	
	207-08-9	Benzo(k)fluoranthene	506	U	
62.	50-32-8	Benzo(a)pyrene	426	U	
63.	193-39-5	Indeno(1,2,3-c,d)pyrene	466	U	
64.	53-70-3	Dibenzo(a,h)anthracene	417	U	
65.	191-24-2	Benzo(g,h,i)perylene	463	U	

	SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
66.	2-Fluorophenol	77	25-121	20000
67.	Phenol-d5	93	24-113	20000
68.	Nitrobenzene-d5	62	23-120	10000
69.	2-Fluorobiphenyl	74	30-115	10000
70.	Terphenyl-d14	77	18-137	10000
71.	2,4,6-Tribromophenol	94	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

N/A

Customer: O.H. MATERIALS CORPORATION

[redacted]: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747

[redacted]n: N/A

Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water)	Soil	Lab Sample I.D.:	BLANK
Sample Weight:	10.0 g	Date Sampled:	N/A
Extract Volume:	1.0 mL	Date Received:	N/A
Injection Volume:	1 µL	Date Extracted:	07/18/94
		Date Analyzed:	07/19/94
Percent Solid:	100 %	**Preparation Batch:**	BNAS0718
Dilution Factor:	1	**Instrument Batch:**	B0719-1
Lab Notebook No:	402, Pg. 97		

BLANK

CAS NO.	COMPOUND	DETECTION LIMITS (µg/kg)	RESULTS	FLAG

ALL COMPOUNDS ARE BELOW DETECTION LIMIT.

SURROGATE STANDARD	RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
2-Fluorophenol	70	25-121	20000
Phenol-d5	83	24-113	20000
Nitrobenzene-d5	62	23-120	10000
2-Fluorobiphenyl	65	30-115	10000
Terphenyl-d14	69	18-137	10000
2,4,6-Tribromophenol	71	19-122	20000

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER: 0003

Customer: O.H. MATERIALS CORPORATION
Source: Fort Riley, KS (TANKS)
Cust. Proj. No.: 15747
Location: Soil From West End of Excavation
Analysis: SEMIVOLATILE EPA 8270

Matrix:(soil/water) SOIL
Sample Weight: 10.0 g
Extract Volume: 1.0 mL
Injection Volume: 1 µL

Percent Solid: 100 %
Dilution Factor: 1
Lab Notebook No: 402. Pg. 97

Lab Sample I.D.: 19365-003 Duplicate
Date Sampled: 07/14/94
Date Received: 07/16/94
Date Extracted: 07/18/94
Date Analyzed: 07/19/94
Preparation Batch: BNAS0718
Instrument Batch: B0719-1

DUPLICATE

COMPOUND	DETECTION LIMIT (µg/kg)	SAMPLE RESULT (µg/kg)	DUPLICATE RESULT (µg/kg)	FLAG
bis(2-Ethylhexyl)phthalate	306	1080	541	

ALL OTHER COMPOUNDS ARE BELOW DETECTION LIMIT.

SURROGATE STANDARD	SAMPLE RECOVERY (%)	DUPLICATE RECOVERY (%)	ACCEPTABLE	SPIKE (µg/kg)
2-Fluorophenol	76	71	25-121	20000
Phenol-d5	92	85	24-113	20000
Nitrobenzene-d5	62	61	23-120	10000
2-Fluorobiphenyl	73	68	30-115	10000
[illegible]phenyl-d14	80	71	18-137	10000
2,4,6-Tribromophenol	83	81	19-122	20000

U: Below Detection Limit

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

N/A

O.H. MATERIALS CORPORATION

Fort Riley, KS (TANKS) Cust. Proj. No.: 15747

N/A

lysis: SEMIVOLATILE EPA 8270

ix: (soil/water) Soil Lab Sample I.D.: 19365-LCSS

paration Batch: BNAS0718 Instrument Batch: B0719-1

LABORATORY CONTROL SAMPLE

COMPOUND		TRUE VALUE (µg/kg)	FOUND (µg/kg)	% REC #	QC LIMITS % REC.
enol		20000	15600	78	26-90
-Chlorophenol		20000	14500	73	25-102
,4-Dichlorobenzene		10000	4110	41	28-104
-Nitroso-di-n-Propylamine		10000	8760	88	41-126
,2,4-Trichlorobenzene		10000	6690	67	38-107
-Chloro-3-Methylphenol		20000	13500	68	26-103
enaphthene		10000	6570	66	31-137
-Nitrophenol		20000	15700	79	11-114
,4-Dinitrotoluene		10000	7610	76	28-89
entachlorophenol		20000	19800	99	17-109
yrene		10000	8670	87	35-142

Column to be used to flag recovery values with an asterisk

Values outside of QC limits

Spike Recovery: 0 out of 11 outside limits

OMMENTS:

ENVIRONMENTAL CHEMICAL CORPORATION

QUALITY CONTROL

SAMPLE NUMBER

0004

O.H. MATERIALS CORPORATION

urce: Fort Riley, KS (TANKS) Cust. Proj. No.: 15747

cation: Soil From Bottom Side of South Wall

alysis: SEMIVOLATILE EPA 8270

atrix: (soil/water) SOIL Lab Sample I.D.: 19365-004

eparation Batch: BNAS0718 Instrument Batch: B0719-1

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

COMPOUND	SPIKE ADDED (µg/kg)	SAMPLE CONC. (µg/kg)	MS CONC. (µg/kg)	% REC #	QC LIMITS % REC.
henol	20000	0.0	16400	82	26-90
-Chlorophenol	20000	0.0	15300	76	25-102
,4-Dichlorobenzene	10000	0.0	3620	36	28-104
-Nitroso-di-n-Propylamine	10000	0.0	9310	93	41-126
,2,4-Trichlorobenzene	10000	0.0	5990	60	38-107
-Chloro-3-Methylphenol	20000	0.0	15500	78	26-103
enaphthene	10000	0.0	7510	75	31-137
-Nitrophenol	20000	0.0	18100	90	11-114
,4-Dinitrotoluene	10000	0.0	8430	84	28-89
entachlorophenol	20000	0.0	20800	104	17-109
yrene	10000	0.0	7780	78	35-142

ND	SPIKE ADDED (µg/kg)	MSD CONC. (µg/kg)	MSD % REC	% RPD #	QC LIMITS RPD	QC LIMITS REC.
enol	20000	15000	75	9	35	26-90
-Chlorophenol	20000	14200	71	7	50	25-102
4-Dichlorobenzene	10000	3440	34	6	27	28-104
-Nitroso-di-n-Propylamine	10000	8250	82	13	38	41-126
2,4-Trichlorobenzene	10000	5260	53	12	23	38-107
-Chloro-3-Methylphenol	20000	12900	65	18	33	26-103
enaphthene	10000	6500	65	14	19	31-137
-Nitrophenol	20000	15900	79	13	50	11-114
4-Dinitrotoluene	10000	7720	77	9	47	28-89
entachlorophenol	20000	19900	99	5	47	17-109
rene	10000	7660	77	1	36	35-142

Column to be used to flag recovery and RPD values with an asterisk

s outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

MMENTS:

[illegible] CA,20,CHR,AD,1
[illegible] (200) = 261.0000
[illegible] 200

Type	# pts	scan#	range: amu/r.t.	base	File	ion range
MI	201	261	41.00- 444.40	9529.0	>DF719	

[illegible]
[illegible]
[illegible] DFTPP[illegible]
DFTPP FROM [illegible] YOUR [illegible] ROOM
[illegible]
[illegible]

[illegible] PERFORMANCE STANDARD

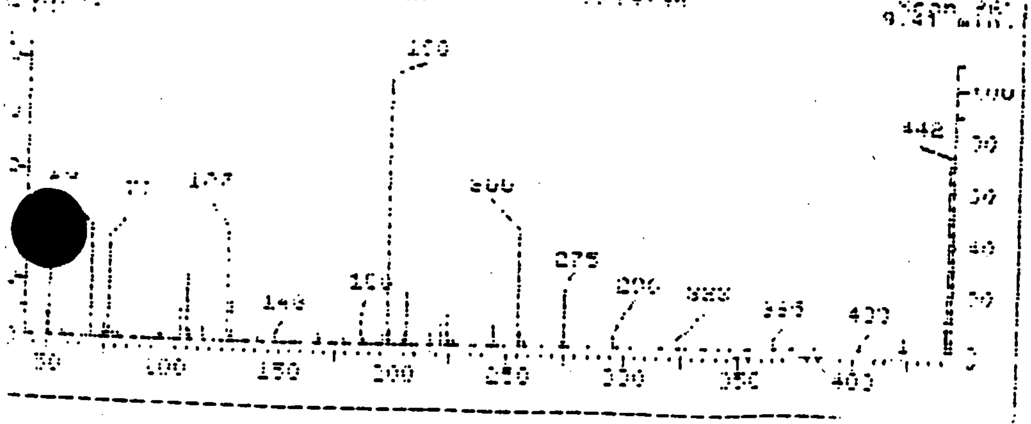
Decafluorotriphenylphosphine (DFTPP)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
[illegible]	30-60% of mass 198	33.30	33.30	Ok
[illegible]	Less than 2% of mass 69	0.00	0.00	Ok
[illegible]	(reference only)	40.62	40.62	Ok
[illegible]	Less than 2% of mass 69	.57	1.26	Ok
[illegible]	40-60% of mass 198	41.02	41.02	Ok
[illegible]	Less than 1% of mass 198	0.00	0.00	Ok
[illegible]	Base peak, 100% relative abundance	100.00	100.00	Ok
[illegible]	5-9% of mass 198	6.88	6.88	Ok
[illegible]	10-30% of mass 198	20.85	20.85	Ok
[illegible]	Greater than 1% of mass 198	2.15	2.15	Ok
[illegible]	0-100% of mass 443	10.60	65.44	Ok
[illegible]	Greater than 40% of mass 198	27.62	27.62	Ok
[illegible]	17-23% of mass 442	16.19	22.28	Ok

Injection Date: 07/19/94
Injection Time: 14:56
Data File: >DF719
Scan: 261

7/21/94

[illegible]
THIS IS A VALID SPECTRUM
[illegible] A VALID SPECTRUM



I. Batch

B0719-1

GC/MS #1

2824 A11156

7/19/94

Continuing Calibration Check
HSL Compounds

Case No: [redacted]

Calibration Date: 07/19/94

Contractor: [redacted]

Time: 15:19

[redacted]ct No: [redacted]

Laboratory ID: >8N719

Instrument ID: 2824A11156

Initial Calibration Date: 06/30/94

Minimum $\overline{RF}$ for SPCC is 0.050

Maximum % Diff for CCC is 30.00%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
N-NITROSO-DIMETHYLAMINE	.57674	.53448	7.33			
Pyridine	.26051	-	-			
Aniline	.46174	.55821	20.89			
2-Fluorophenol	.97427	.90569	7.04			(Conc=100.00)
Phenol-d5	.93920	.92026	2.02			(Conc=100.00)
Phenol	.86624	.83815	3.24	*		
Benzyl alcohol	.46350	.38450	17.04			
bis(2-Chloroethyl)Ether	.74861	.92080	23.00			
2-Methylphenol	.62964	.74374	18.12			
3-Methylphenol	.79209	.81318	2.66			
4-Methylphenol	.63800	.67237	5.39			
2-Chlorophenol	.70763	.77865	10.04			
1,3-Dichlorobenzene	.80796	.92119	14.01			
1,4-Dichlorobenzene	.71365	.79490	11.39	*		
1,2-Dichlorobenzene	.79203	.85279	7.67			
[redacted]loroisopropyl)ether	.79662	.83518	4.84			
[redacted]o-Di-n-propylamine	.62245	.65804	5.72		**	
Hexachloroethane	.32497	.31217	3.94			
Nitrobenzene-d5	.44667	.47494	6.33			(Conc=50.00)
Nitrobenzene	.44437	.43213	2.75			
Isophorone	.88605	.95086	7.31			
2-Nitrophenol	.27610	.24664	10.67	*		
2,4-Dimethylphenol	.44782	.44157	1.40			
Benzoic acid	.19795	.19338	2.31			
Bis(2-Chloroethoxy)methane	.48985	.58571	19.57			
2,4-Dichlorophenol	.28120	.32032	13.91	*		
1,2,4-Trichlorobenzene	.32346	.32325	.07			
Naphthalene	.93172	1.03133	10.69			
4-Chloroaniline	.50782	.53529	5.41			
Hexachlorobutadiene	.14908	.16396	9.99	*		
4-Chloro-3-methylphenol	.39826	.38369	3.66	*		
2-Methylnaphthalene	.68643	.66673	2.87			

- Response Factor from daily standard file at 50.00 ng/uL

- Average Response Factor from Initial Calibration Form VI

iff - % Difference from original average or curve

[redacted]Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

5 7/21/94

I. Batch
B0719-1
GC/MS #1
2824A11156
7/19/94

Continuing Calibration Check
HSL Compounds

Case No: [redacted]
Calibration Date: 07/19/94

Contractor: [redacted]
Time: 15:19

[redacted]t No: [redacted]
Laboratory ID: >BN719

Instrument ID: 2824A11156
Initial Calibration Date: 06/30/94

Minimum $\overline{RF}$ for SPCC is 0.050
Maximum % Diff for CCC is 30.00%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
iexachlorocyclopentadiene	.26658	.24240	9.07		**	
?,4,6-Trichlorophenol	.44814	.43266	3.46	*		
-Chloronaphthalene	1.14404	1.21299	6.03			
'-Fluorobiphenyl	1.25495	1.29514	3.20			(Conc=50.00)
imethylphthalate	1.62381	1.62881	.31			
cenaphthylene	1.61554	1.90206	17.74			
cenaphthene	.93979	1.03827	10.48	*		
,4-Dinitrophenol	.13661	.09642	29.42		**	
-Nitrophenol	.10079	.09142	9.29		**	
,4-Dinitrotoluene	.34957	.34405	1.58			
,6-Dinitrotoluene	.33235	.33946	2.14			
-Nitroaniline	.52041	.51208	1.60			
-Nitroaniline	.28266	.33916	19.99			
-Nitroaniline	.18321	.17752	3.11			
iethylphthalate	1.39547	1.41843	1.64			
benzofuran	1.40343	1.45136	3.42			
[redacted]ichlorophenol	.41185	.42697	3.67			
[redacted]phenyl-phenylether	.35736	.49075	37.33			
uorene	.83068	.96243	15.86			
obenzene	1.29316	1.25659	2.83			
4,6 Tribromophenol	.11221	.09250	17.56			(Conc=100.00)
Nitrosodiphenylamine	.50733	.63116	24.41	*		
6-Dinitro-2-methylphenol	.15184	.12030	20.77			
Bromophenyl-phenylether	.23590	.23441	.63			
xachlorobenzene	.24707	.22870	7.43			
ntachlorophenol	.11189	.09495	15.14	*		
enanthrene	1.01867	1.10104	8.09			
:hracene	.93739	1.05772	12.84			
bazole	.73786	.83291	12.88			
-n-Butylphthalate	1.30234	1.50440	15.52			
oranthene	.84859	.85274	.49	*		
zidine	.03601	-	-			

- Response Factor from daily standard file at 50.00 ng/uL

- Average Response Factor from Initial Calibration Form VI

ff - % Difference from original average or curve

- Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

[redacted]

Continuing Calibration Check
HSL Compounds

Case No: [redacted]

Calibration Date: 07/19/94

Contractor: [redacted]

Time: 15:19

[redacted]t No: [redacted]

Laboratory ID: >8N719

Instrument ID: 2824A11156

Initial Calibration Date: 06/30/94

Minimum $\overline{RF}$ for SPCC is 0.050

Maximum %Diff for CCC is 30.00%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
Pyrene	2.35852	2.45795	4.22			
Terphenyl-d14	1.33533	1.34162	.47			(Conc=50.00)
Butylbenzylphthalate	1.15938	1.29044	11.30			
3,3'-Dichlorobenzidine	.38523	.26295	31.74			
Benzo(a)Anthracene	1.30836	1.36205	4.10			
Bis(2-Ethylhexyl)phthalate	1.20961	1.40726	16.34			
Chrysene	1.01796	.99566	2.19			
Di-n-octylphthalate	1.67049	2.10769	26.17	*		
Benzo(b)Fluoranthene	1.85188	1.81291	2.10			
Benzo(k)fluoranthene	1.49172	1.46965	1.48			
Benzo(a)pyrene	1.56035	1.47597	5.41	*		
Indeno(1,2,3-cd)Pyrene	1.63159	1.41902	13.03			
Dibenz(a,h)Anthracene	1.21915	1.12625	7.62			
Benzo(g,h,i)Perylene	1.31286	1.18194	9.97			
1,2,3,5-Tetramethylbenzene	-	-	-			
[redacted]	-	-	-			(Conc=50.00)
	-	-	-			(Conc=50.00)
METHOXYCHLOR	-	-	-			(Conc=50.00)

- Response Factor from daily standard file at 50.00 ng/uL

- Average Response Factor from Initial Calibration Form VI

Diff - % Difference from original average or curve

[redacted] Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

& 7/21/94

PROJECT: Ft. Riley KS (FTRLKS)

Cooler # ____

Date Received: 7-16-94

USE OTHER SIDE OF THIS FORM TO NOTE FURTHER DETAILS CONCERNING CHECK-IN PROBLEMS AND TO SPECIFY AND DESCRIBE ANY ACTION(S) REGARDING THE RESOLUTION(S) OF PROBLEMS. IF SHIPMENT WAS ACCEPTED AND IF REQUESTED, NOTE ON BACK THE ADDRESS WHERE THE EMPTY COOLER WAS RETURNED AND LIKEWISE IF THE SHIPMENT WAS REJECTED.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 7-16-94

by (print) Denise DeTellem (sign) Denise DeTellem

1. Were custody seals on outside of cooler? YES (NO)
   If YES, how many and where: N/A
   Date & Signature correct? If YES, seal date: N/A. name: N/A YES (NO)
2. Were custody seals unbroken and intact at the date and time of arrival: YES (NO)
3. Were custody papers sealed in a plastic bag & taped inside to the lid? (YES) NO
4. Was project identifiable from custody papers? If YES, enter project name at top of this form (YES) NO
5. Were custody papers filled out properly (ink, signed, etc.)? (YES) NO
6. Did you sign custody papers in the appropriate place? (YES) NO
7. Did cooler come with a shipping slip (air bill, etc.)? (YES) NO
   If YES, attach & enter air bill or invoice number here: Federal Express/UPS 577473844
8. Designated person initial here to acknowledge receipt of cooler: DD (date) 7-16-94

LOG-IN PHASE: Date samples were logged-in: 7-16-94

(print) Denise DeTellem (sign) Denise DeTellem

Describe Packaging: (ICE) ICE PACKS PEANUTS (PACKING MATERIAL)

If required, was enough ice used? TEMP: 2°C (YES) NO

Were all bottles sealed in separate plastic bags? (YES) NO

Did all bottles arrive unbroken & in good condition? (YES) NO

Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? (YES) NO

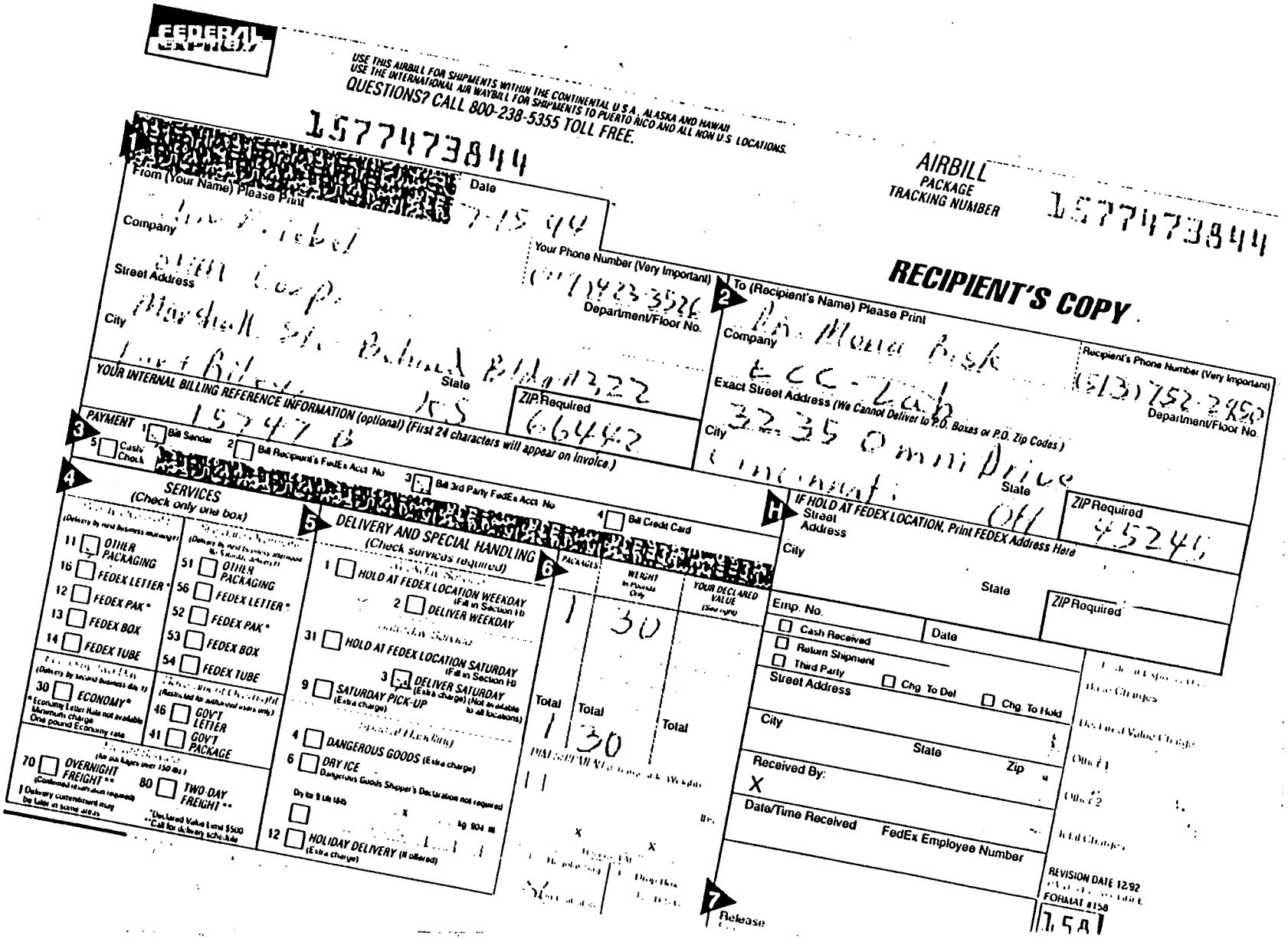
Did all bottle labels agree with custody papers? If NO, indicate discrepancies on back (YES) NO

Were correct containers used for the tests indicated? (YES) NO

Were correct preservatives used when required? (YES) NO

Sufficient amount of sample sent for tests indicated? (YES) NO

Bubbles absent in VOA vials? N/A YES NO



FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

1577473844

AIRBILL PACKAGE TRACKING NUMBER 1577473844

RECIPIENT'S COPY

1 From (Your Name) Please Print — Date 7-15-94
Company
Your Phone Number (Very Important)
Street Address
Department/Floor No.
City
State
ZIP Required
YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice)

2 To (Recipient's Name) Please Print
Company
Recipient's Phone Number (Very Important)
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes)
Department/Floor No.
City
State
ZIP Required

3 PAYMENT 1 Bill Sender 2 Bill Recipient's FedEx Acct No 3 Bill 3rd Party FedEx Acct No 4 Bill Credit Card 5 Cash/Check

4 SERVICES (Check only one box)
(Delivery by next business morning)
11 OTHER PACKAGING
16 FEDEX LETTER*
12 FEDEX PAK*
13 FEDEX BOX
14 FEDEX TUBE
(Delivery by second business day)
30 ECONOMY**
*Economy Letter Rate not available. Minimum charge: One pound Economy rate
(Delivery by next business afternoon to Canada destinations)
51 OTHER PACKAGING
56 FEDEX LETTER*
52 FEDEX PAK*
53 FEDEX BOX
54 FEDEX TUBE
(Restricted to authorized users only)
46 GOVT LETTER
41 GOVT PACKAGE
(Not available for shipments over 150 lbs.)
70 OVERNIGHT FREIGHT** (Combined rate with discount required)
80 TWO-DAY FREIGHT**
Delivery commitment may be later in some areas
**Declared Value Limit $500. Call for delivery schedule

5 DELIVERY AND SPECIAL HANDLING (Check services required)
1 HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
2 DELIVER WEEKDAY
31 HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
3 DELIVER SATURDAY (Extra charge) (Not available to all locations)
9 SATURDAY PICK-UP (Extra charge)
4 DANGEROUS GOODS (Extra charge)
6 DRY ICE (Dangerous Goods Shipper's Declaration not required)
Dry Ice 9 UN 1845 — x — kg
12 HOLIDAY DELIVERY (If offered)

6 PACKAGES | WEIGHT in Pounds Only | YOUR DECLARED VALUE (See right)
1 | 30
Total | Total | Total
1 | 30
x | x

7 Release

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address
City
State
ZIP Required

Emp. No. | Date
Cash Received
Return Shipment
Third Party
Chg. To Del
Chg. To Hold
Street Address
City
State
Zip
Received By: X
Date/Time Received
FedEx Employee Number

Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 12/92
FORM/PAT #150

154

ecelved by: (print name)
Denise DeTellem

Page 1 of 1

Log-In Date 7-16-94

ecelved by: (signature) Denise DeTellem

emarks:

Custody Seal(s) Present/Absent
Intact/Broken

Custody Seal Nos.: N/A

Chain-of Custody Records Present/Absent

Airbill Airbill/Sticker Present/Absent

Airbill No.: 1577473844 Fed-Ex

Sample Condition: Intact/Broken*/Leaking

Information on records, traffic reports, and sample tags agree? Yes/No

Date Received at Lab: 7-16-94

Time Received: 10.45

Customer Sample #	Corresponding Site	ECC #	pH	Remarks: Condition of Sample Shipment, etc.
0001	A. Shiloh (TANKS)	19365-001	N/A	
0002		002		
0003		003		
0004		004		
0005		005		
0006	✓	006	✓	

Sample Transfer

ion	Fraction
#	Area #
	By
	On

tact USACOE and attach record of resolution.

ved By: Denise DeTellem
7-16-94

Environmental Chemical Corp.
Problems & Corrective Action Sheet

Customer Name: OHM CORP.
Location: Ft. Riley. KS (TANKS)
Date Rec'd: 7-16-94

PROBLEMS

1. No custody seals on outside of cooler.

CORRECTIVE ACTION

Received By: Jennifer DeTellem
Date: 7-16-94
Time: 10:45

OHM REMEDIATION SERVICES CORP
MIDWEST DIVISION - TECHNICAL SERVICES
LABORATORY SAMPLE RECEPTION CONFIRMATION

Telephone #: 800/537-9540, Ex 4198 or 4266 FAX #: 419/425-6085

Send to the Attention of: Chet Scheibel

TO BE COMPLETED BY THE LABORATORY
NOTE: A Copy of the COCs must be Enclosed with this Form

DATE: 7-16-94

LABORATORY NAME: ECC

LABORATORY LOCATION: Cinci. OH

PREPARED BY: Denise DeTellem
(PRINT LEGIBLY)

PROJECT NUMBER: 15747

DATE SAMPLES RECEIVED: 7-16-94

NUMBER OF SAMPLES: 6

SOIL: X

WATERS: _____

SOLIDS: _____

TURN-AROUND-TIME REQ: 7 day TAT

TO BE COMPLETED BY OHM TECH SERV LAB PROCUREMENT DEPARTMENT:

DATE RESULTS RECEIVED BY OHM: 7/22

METHOD OF RECEPTION: D ✓ Fax F 7/27 Fed X ____ Mail

ACTUAL TURN-AROUND-TIME: 7

VALUE OF SAMPLE ANALYSIS: $_____

OHM Corporation

CHAIN-OF-CUSTODY RECORD

Form 0019
Technical Services
Rev. 08/89

134471

O.H. MATERIALS CORP. • P.O. BOX 551 • FINDLAY, OH 45839-0551 • 419-423-3526

PROJECT NAME: Fort Riley, KS (TANKS)	PROJECT LOCATION: Fort Riley, KS
PROJ. NO.: 15747	PROJECT CONTACT: Jerry Resnik, John Friebel
PROJECT TELEPHONE NO. (NA): 414-423-3526	
CLIENT'S REPRESENTATIVE: Bob Holcomb	PROJECT MANAGER/SUPERVISOR: Jerry Resnik, Dewayne Holcomb

ITEM NO.	SAMPLE NUMBER	1994 DATE	TIME	COMP	GRAB	SAMPLE DESCRIPTION (INCLUDE MATRIX AND POINT OF SAMPLE)	NUMBER OF CONTAINERS	ANALYSIS DESIRED (INDICATE SEPARATE CONTAINERS): SVOC 8270	VOC 8240	Modified 8015 TPH	REMARKS
1	0001	7-14	11:12		V	From Bottom of Tank 1 Soil	2	X	X	X	
2	0002	7-14	11:08		V	Soil From Bottom of Tank 2	2	X	X	X	
3	0003	7-14	11:15		V	Soil From West End of Excavation	2	X	X	X	
4	0004	7-14	13:54		V	Soil From Bottom Side of South Wall	2	X	X	X	
5	0005	7-14	1400		V	Soil Bottom Side North Wall	2	X	X	X	
6	0006	7-14	11:16		V	Soil Top Side of South Wall	2	X	X	X	
7											
8											
9											
10											

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	TRANSFERS ACCEPTED BY	DATE	TIME
1	1-6		Denise DeTellem	7-16-94	1045
2					
3					
4					

REMARKS: TAT 7-days
Report Results to
Chet Scheibel
800-537-9540

SAMPLER'S SIGNATURE: Dewayne Holcomb

OHM Corporation

REQUEST FOR ANALYTICAL SERVICES

PROJECT INFORMATION

Project Name:	Fort Riley	Project No:	15747
Client:	USACE	Project Manager:	Jerry Resnik
Project Location:	Fort Riley, KS	Technical Manager:	
Date Submitted		QA Officer:	Chet Scheibel
ARF Date:	7/15/94	Sampling Date:	7/14/94

Laboratory Information

LABORATORY INFORMATION	
Laboratory Name	ECC
Street Address	3235 Omni Drive
City, State	Cincinnati, OH 45245
Phone Number	513/752-2950
Laboratory Contact	Mona Risk

APPROVALS

	SIGNATURES
QUALITY ASSURANCE OFFICER	Chet Scheibel
PROJECT MANAGER	Jerry Resnik
CLIENT REPRESENTATIVE	

SAMPLE INFORMATION

Quantity	Matrix	Description	Analyses	Turn-around time
6	Solid	Soil	SVOC, VOCs, TPH GRO, TPH DRO	7 Days

NOTE:(1) The results (including QA) may be "faxed" to the Technical QA Officer with a required TAT of seven (7) days or less. An ORIGINAL COPY of the complete data package must then be received within five (5) calendar days of the "fax" date.

(2) For a required TAT of greater than seven (7) days, an ORIGINAL COPY of the complete data package must be received within the requested TAT. The data (including QA) may be "faxed" at an earlier date but the hard copy must be received by the TAT due date.

(3) WITH THE EXCEPTION OF THE ASC LAB, please complete the LABORATORY SAMPLE RECEPTION CONFIRMATION FORM ATTACHED.

Sampling Quality Assurance Samples

Quantity	Sample Matrix	Field Quality Assurance Samples
		Field Blanks (Matrix Blanks)
		Equipment Blanks
		Trip Blanks
		Replicate Samples

Laboratory Quality Assurance Quality Control

Quantity	Matrix	Quality Assurance Samples Required
1 per batch	Soil	Method Blank
1 per batch	Soil	Method Spike
1 per batch	Soil	Matrix Spike
1 per batch	Soil	Matrix Spike Duplicate

Required Laboratory Certifications

Request	Certification	Request	Certification
	EPA Contract Laboratory	XXX	Corp of Engineers
	State:		MBE, WBE or SDB
	Client:		Other

Deliverables

Request	Deliverable	Request	Deliverable
X	Standard Analytical Report		QC raw data
X	Analytical Summary		Instrument raw data
X	QC Report		CLP package

UST ANALYSIS - GC and IR				
Quantity	Matrix	Parameter	Reference Method	Detection Limit
6	Solid	DRO - Diesel Range Organics	SW-846 8015	10 mg/Kg
6	Solid	GRO - Gasoline Range Organics	SW-846 8015	0.5 mg/Kg

VOLATILE ORGANIC ANALYSES BY GC/MS				
Quantity	Matrix	Parameter	Reference Method	Detection Limit
6	Solid	Total Volatile Organics	8240, 8240A	ug/Kg
		Acetone X		50
		Acrolein X		50
		Acrylonitrile X		50
		Benzene X		5
		Bromodichloromethane X		5
		Bromoform X		5
		Bromomethane (Methyl Bromide) X		10
		Carbon Disulfide X		50
		Carbon Tetrachloride X		5
		Chlorobenzene X		5

VOLATILE ORGANIC ANALYSES BY GCMS				
Quantity	Matrix	Parameter	Reference Method	Detection Limit
		Chlorodibromomethane X		5
		Chloroethane X		10
		2-Chloroethylvinyl Ether X		10
		Chloroform X		5
		1,1-Dichloroethane X		5
		1,2-Dichloroethane X		5
		1,1-Dichloroethene X		5
		1,2-Dichloroethene (total) X		5
		1,2-Dichloropropane X		5
		cis-1,3-Dichloropropene X		5
		trans-1,3-Dichloropropene X		5
		Ethyl Acetate X		10
		Ethyl Benzene X		5
		2-Hexanone X		50
		Methyl Chloride (Chloromethane) X		10
		Methylene Chloride X		5
		Methyl Ethly Ketone (2-Butanone) X		100
		4-Methyl-2-Pentanone X		50
		Styrene X		5
		1,1,2,2-Tetrachloroethane X		5
		1,1,1,2-Tetrachloroethane X		5
		Tetrachloroethene X		5
		Toluene X		5
		1,1,1-Trichloroethane X		5
		1,1,2-Trichloroethane X		5
		Trichloroethene X		5
		Trichlorofluoromethane X		10
		Vinyl Chloride X		10
		Xylene (Total) X		5

SEMIVOLATILE ANALYSES BY GC/MS

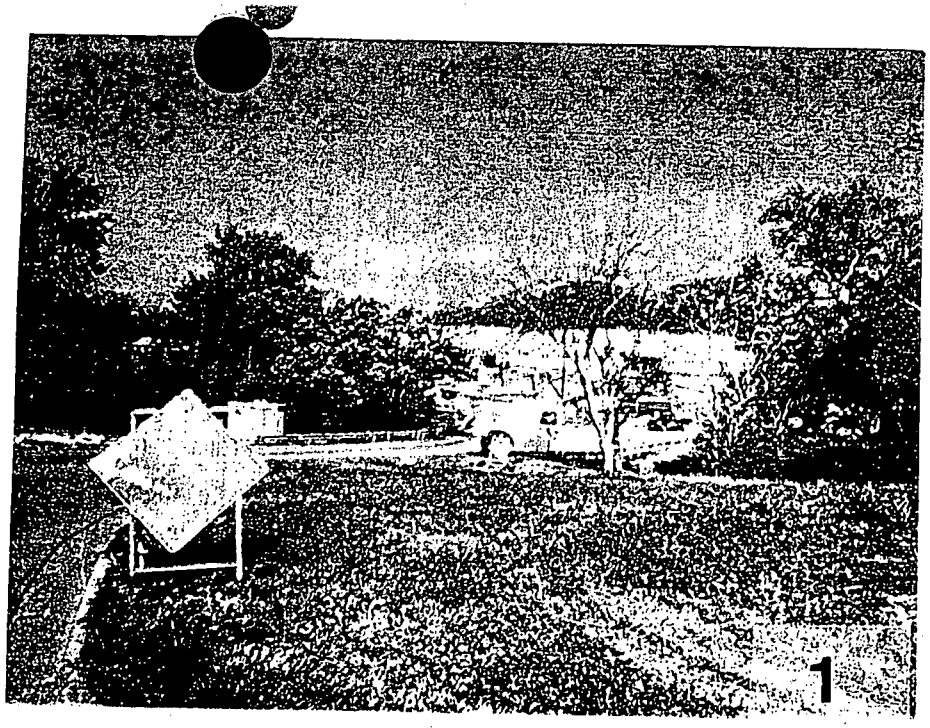
Quantity	Matrix	Parameter	Reference Method	Detection Limit
6	Solid	Semivolatile Organics HSL	8270 or 8270A	
		Acenaphthene X		0.66 mg/Kg
		Acenaphthylene X		0.66 mg/Kg
		Anthracene X		0.66 mg/Kg
		Benzidine X		0.33 mg/Kg
		Benz(a)anthracene X		0.66 mg/Kg
		Benzo(b)fluoranthene X		0.66 mg/Kg
		Benzo(k)fluoranthene X		0.66 mg/Kg
		Benzo(g,h,i)perylene X		0.66 mg/Kg
		Benzo(a)pyrene X		0.66 mg/Kg
		Bis(2-chloroethyl)ether X		0.66 mg/Kg
		Bis(2-chloroethoxy)methane X		0.66 mg/Kg
		Bis(2-chloroisopropyl)ether X		0.66 mg/Kg
		Bis-(2-ethylhexyl)phthalate X		0.66 mg/Kg
		4-Bromophenyl Phenyl Ether X		0.66 mg/Kg
		Butyl benzyl phthalate X		0.66 mg.Kg
		Carbazole X		0.66 mg/Kg
		4-Chloraniline X		1.3 mg/Kg
		4-Chloro-3-methylphenol X		1.3 mg/Kg
		2-Chloronaphthalene X		0.66 mg/Kg
		2-Chlorophenol X		0.66 mg/Kg
		Chrysene X		0.66 mg/Kg
		Dibenz(a,h)anthracene X		0.66 mg/Kg
		Dibenzofuran X		0.66 mg/Kg
		Di-n-butyl Phthalate X		0.66 mg/Kg
		1,2-Dichlorobenzene X		0.66 mg/Kg
		1,3-Dichlorobenzene X		0.66 mg/Kg
		1,4-Dichlorobenzene X		0.66 mg/kg
		3,3'-Dichlorobenzidine X		1.3 mg/Kg
		2,4-Dichlorophenol X		0.66 mg/Kg
		Diethylphthalate X		0.66 mg/Kg

		SEMIVOLATILE ANALYSES BY GCMS		
	Matrix	Parameter	Reference Method	Detection Limit
		2,4-Dimethylphenol X		0.66 mg/Kg
		Dimethylphthalate X		0.66 mg/Kg
		4,6-Dinitro-2-methylphenol X		3.3 mg/Kg
		2,4-Dinitrophenol X		3.3 mg/Kg
		2,4-Dinitrotoluene X		0.66 mg/Kg
		2,6-Dinitrotoluene X		0.66 mg/Kg
		Di-n-octyl phthalate X		0.66 mg/Kg
		Fluoranthene X		0.66 mg/Kg
		Fluorene X		0.66 mg/Kg
		Hexachlorobenzene X		0.66 mg/Kg
		Hexachlorobutadiene X		0.66 mg/Kg
		Hexachlorocyclopentadiene X		0.66 mg/Kg
		Hexachloroethane X		0.66 mg/Kg
		Indeno(1,2,3-cd)pyrene X		0.66 mg/Kg
		Isophorone X		0.66 mg/Kg
		2-Methylnaphthalene X		0.66 mg/Kg
		2-Methylphenol X		0.66 mg/Kg
		4-Methylphenol X		0.66 mg/Kg
		Naphthalene X		3.3 mg/Kg
		2-Nitroaniline X		3.3 mg/Kg
		3-Nitroaniline X		1.3 mg/Kg
		4-Nitroaniline X		0.66 mg/Kg
		Nitrobenzene X		0.66 mg/Kg
		2-Nitrophenol X		3.3 mg/Kg
		4-Nitrophenol X		1.3 mg/Kg
		N-Nitrosodimethylamine X		0.66 mg/Kg
		N-Nitrosodiphenylamine X		0.66 mg/Kg
		N-Nitroso-di-n-propylamine X		3.3 mg/Kg
		Pentachlorophenol X		0.66 mg/Kg
		Phenanthrene X		0.66 mg/Kg
		Phenol X		0.66 mg/Kg
		Pyrene X		

SEMIVOLATILE ANALYSES BY GC/MS				
Number	Matrix	Parameter	Reference Method	Detection Limit
		Pyridine X		0.66 mg/Kg
		1,2,4-Trichlorobenzene X		0.66 mg/Kg
		2,4,5-Trichlorophenol X		0.66 mg/Kg
		2,4,6-Trichlorophenol X		0.66 mg/Kg

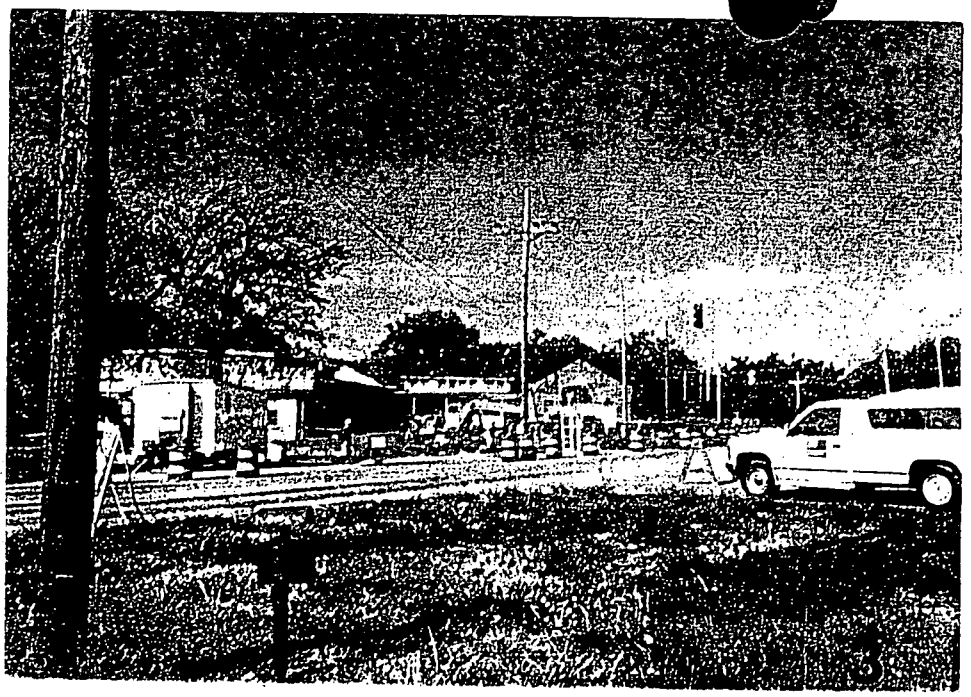
APPENDIX G

PHOTO DOCUMENTATION

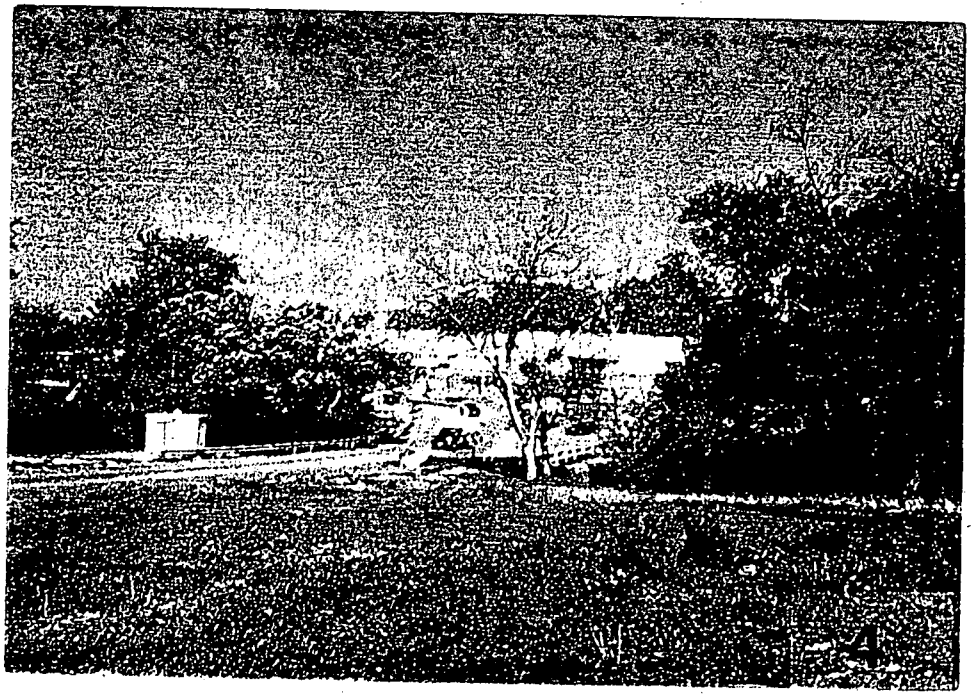


TRAFFIC CONTROL ON CUSTER AVENUE - MIDDLE OF PROJECT

TRAFFIC CONTROL ON CUSTER AVENUE - MIDDLE OF PROJECT

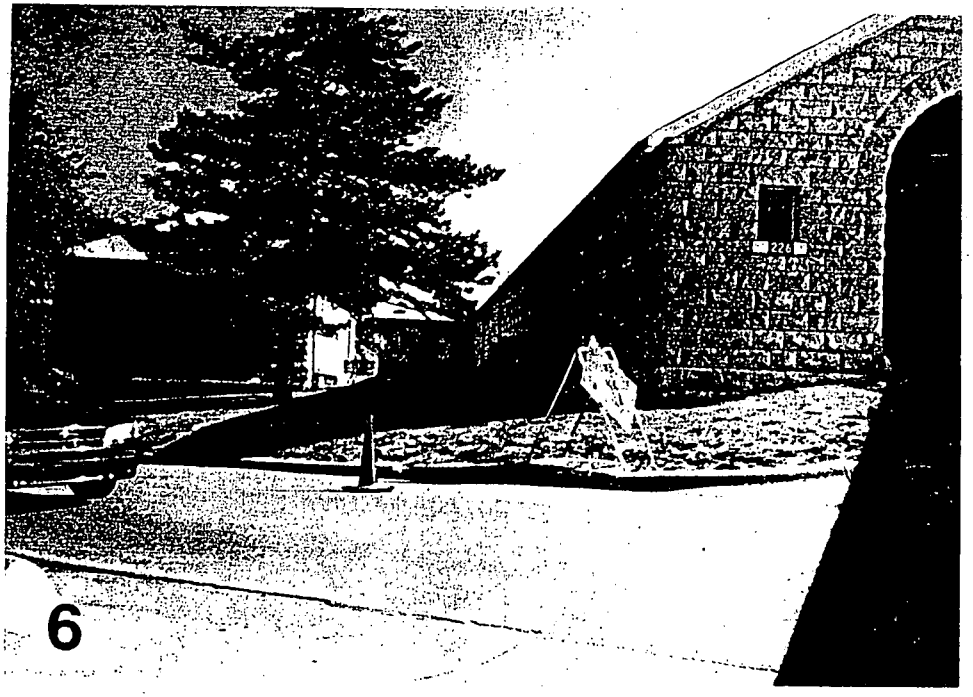


TRAFFIC LIGHT AT SEWER LINE - MIDDLE OF PROJECT



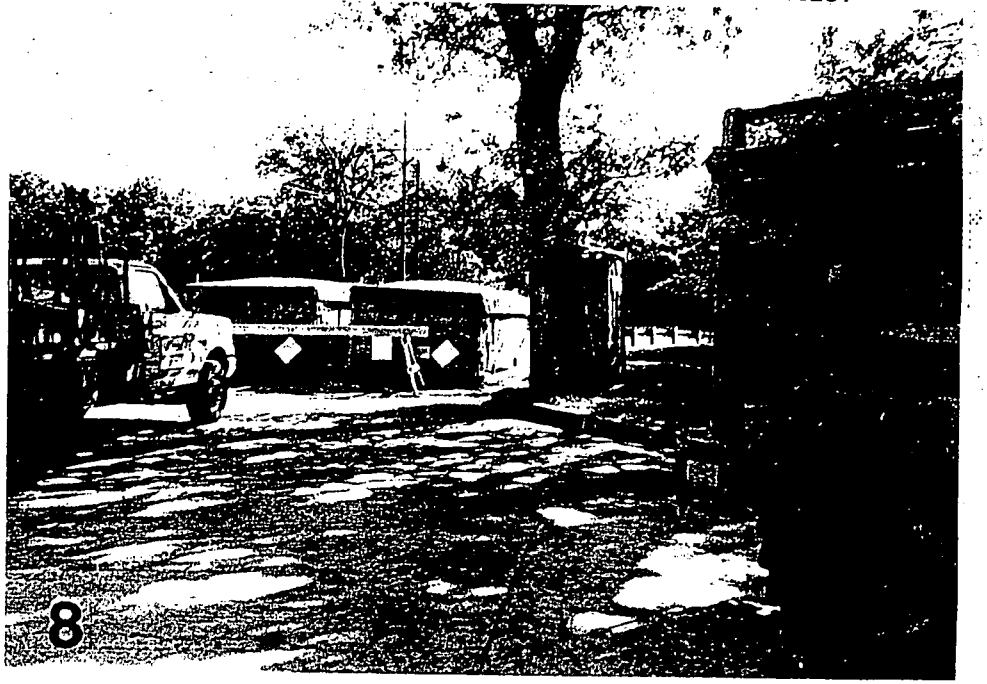
TRAFFIC CONTROL ON CUSTER AVENUE - MIDDLE OF PROJECT

MISCELLANEOUS

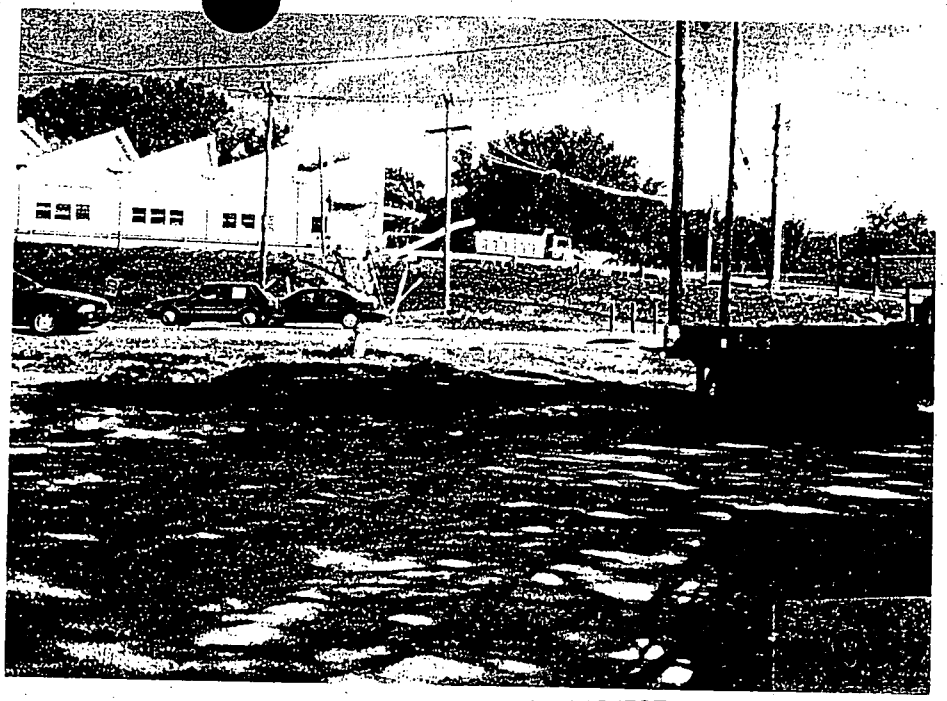


TRAFFIC CONTROL - BEGINNING OF PROJECT

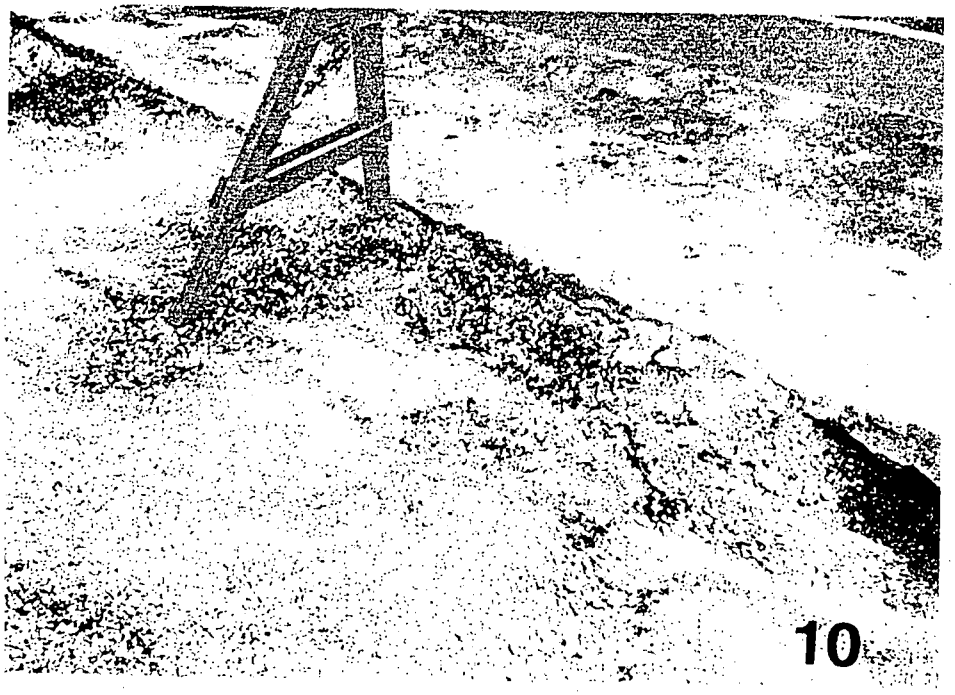
LOWER MANHOLE PRIOR TO EXCAVATION - BEGINNING OF PROJECT



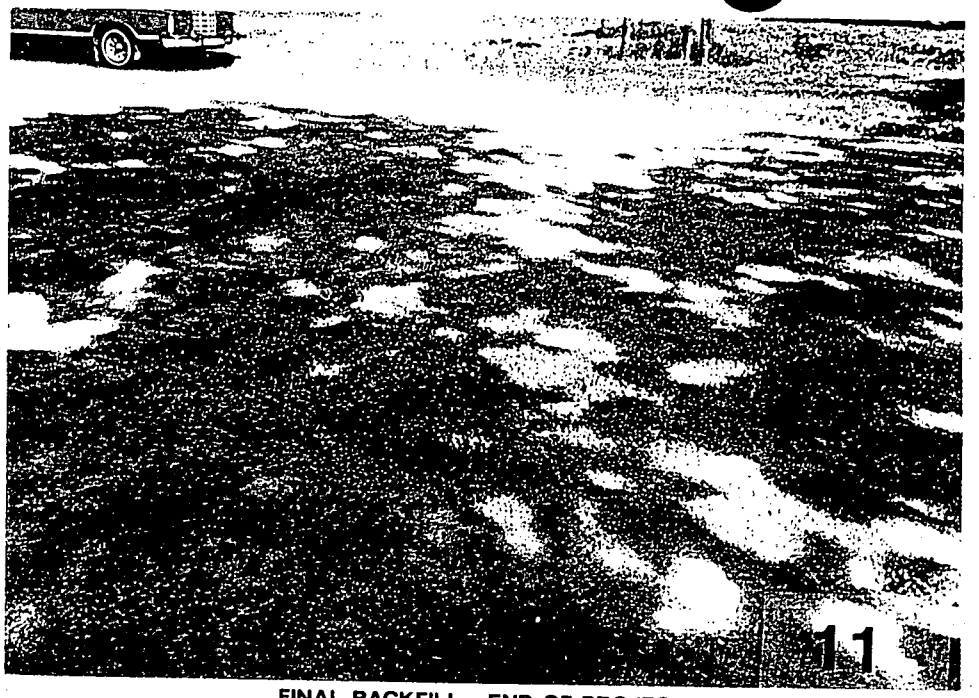
STAGED ROLL-OFFS - END OF PROJECT



FINAL BACKFILL - END OF PROJECT

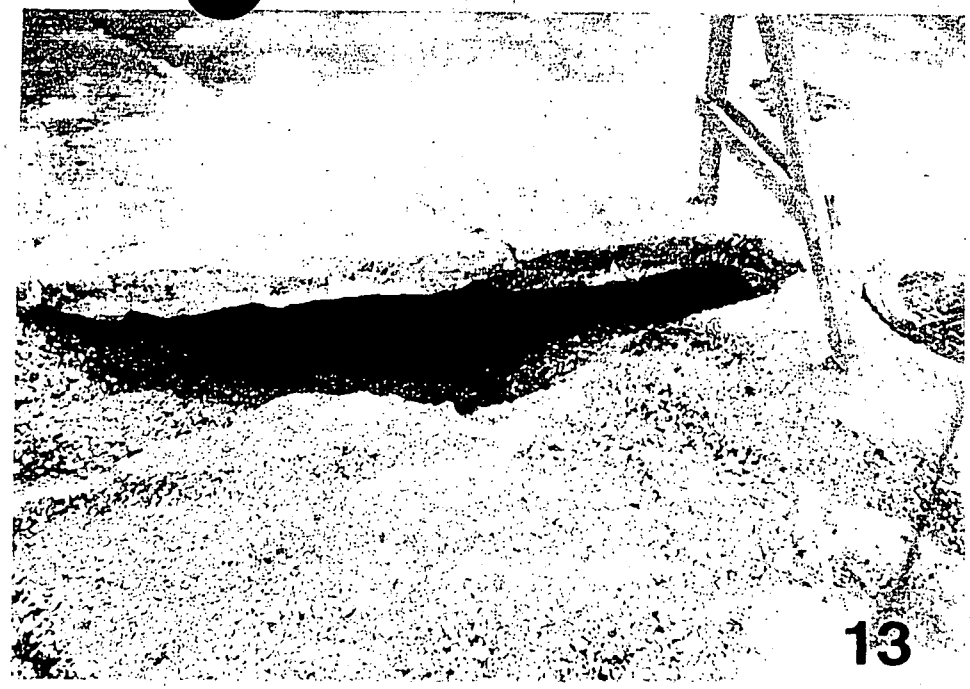


PARTIAL VIEW OF WASHOUT - NEAR END OF PROJECT



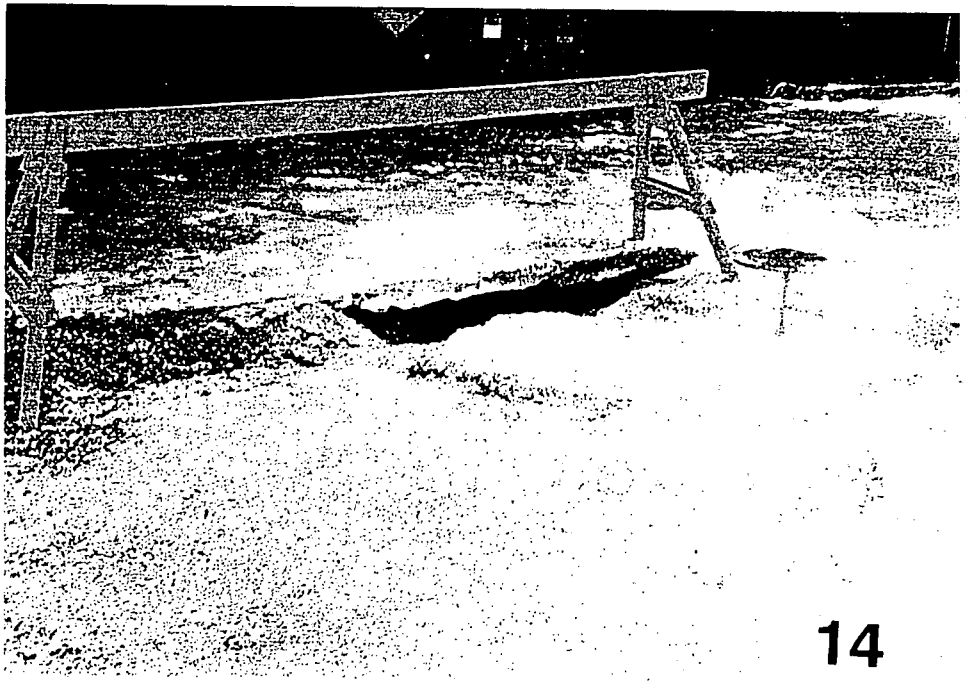
FINAL BACKFILL - END OF PROJECT

FINAL BACKFILL - END OF PROJECT



13

WASHOUT NEAR LOWER MANHOLE - NEAR END OF PROJECT



14

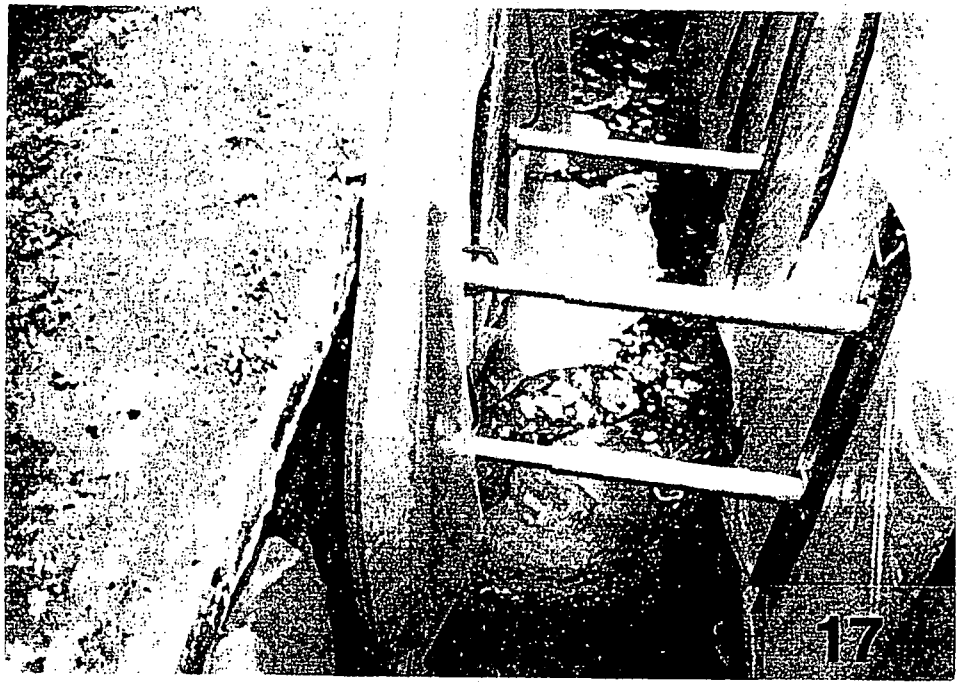
WASHOUT NEAR LOWER MANHOLE - NEAR END OF PROJECT

15

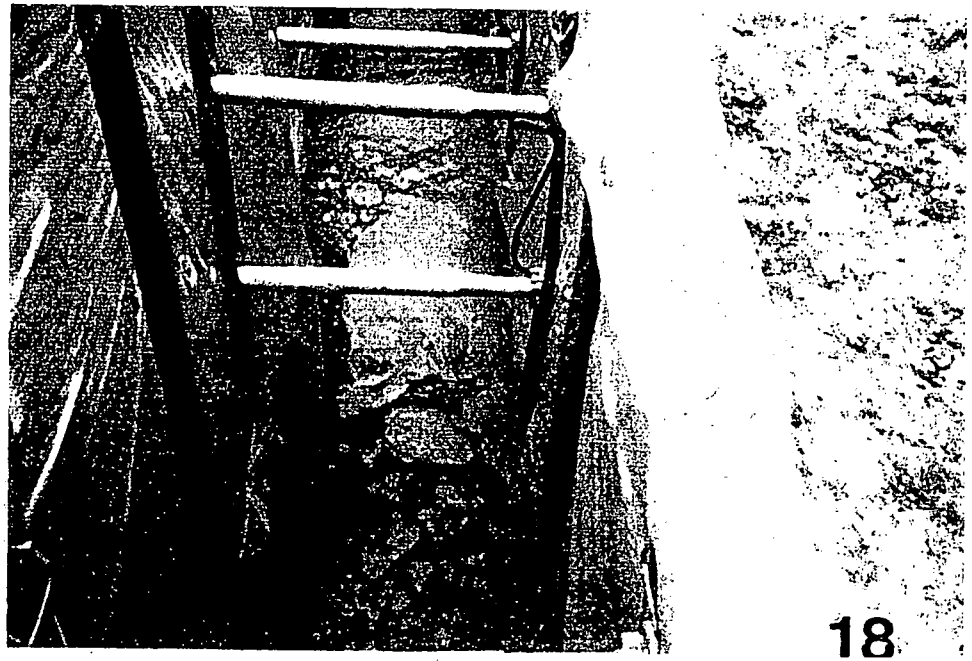
WASHOUT NEAR LOWER MANHOLE - NEAR END OF PROJECT

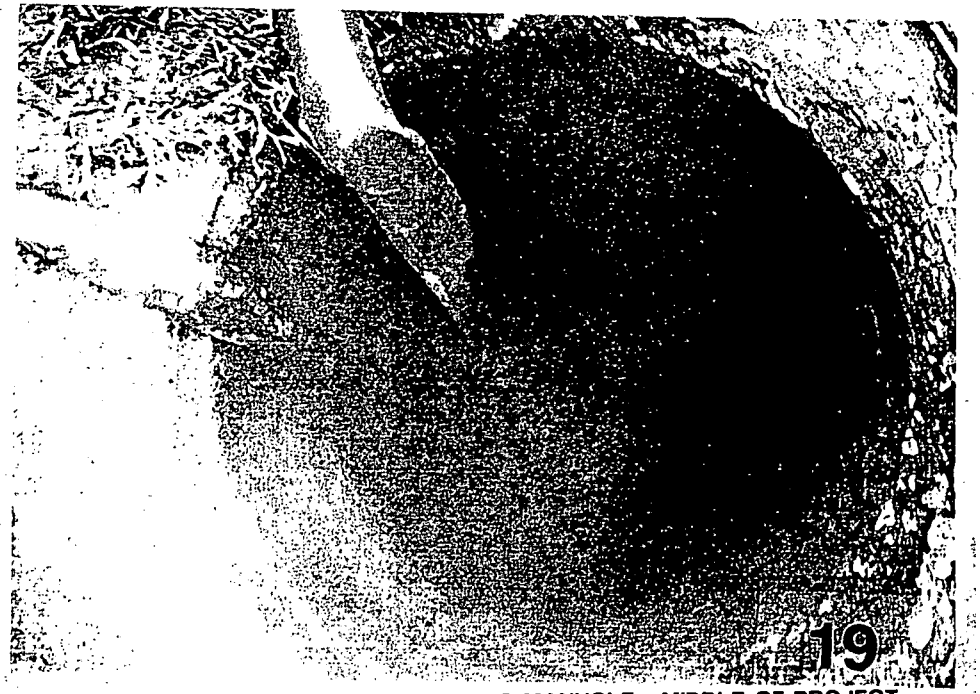
16

COMMENCEMENT OF TRENCH BACKFILL - NEAR END OF PROJECT

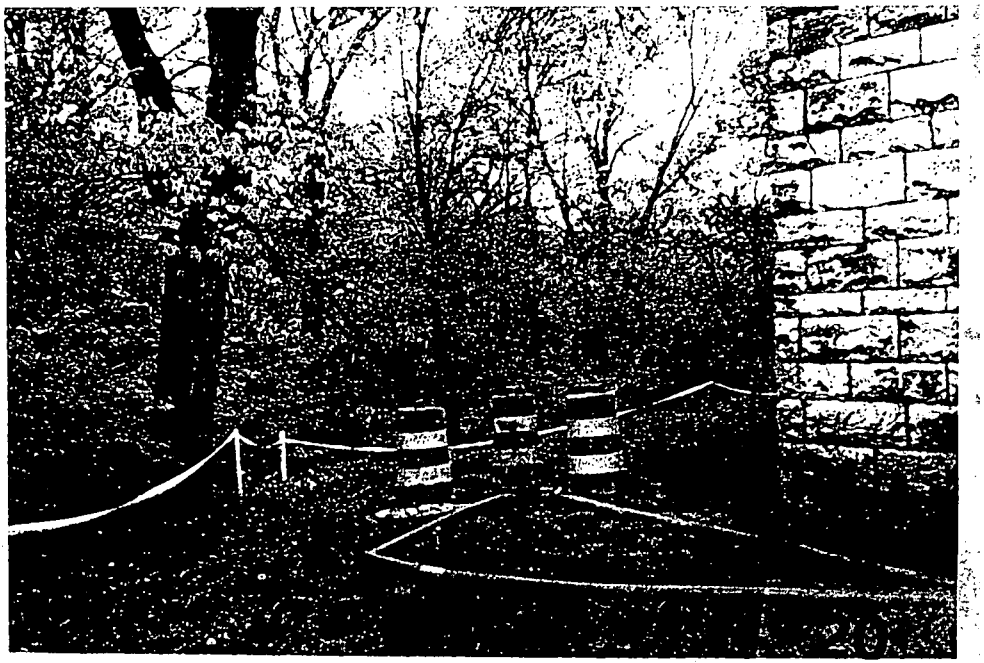


WATER IN EXCAVATION FROM OVERFLOWING MANHOLE - MIDDLE OF PROJECT



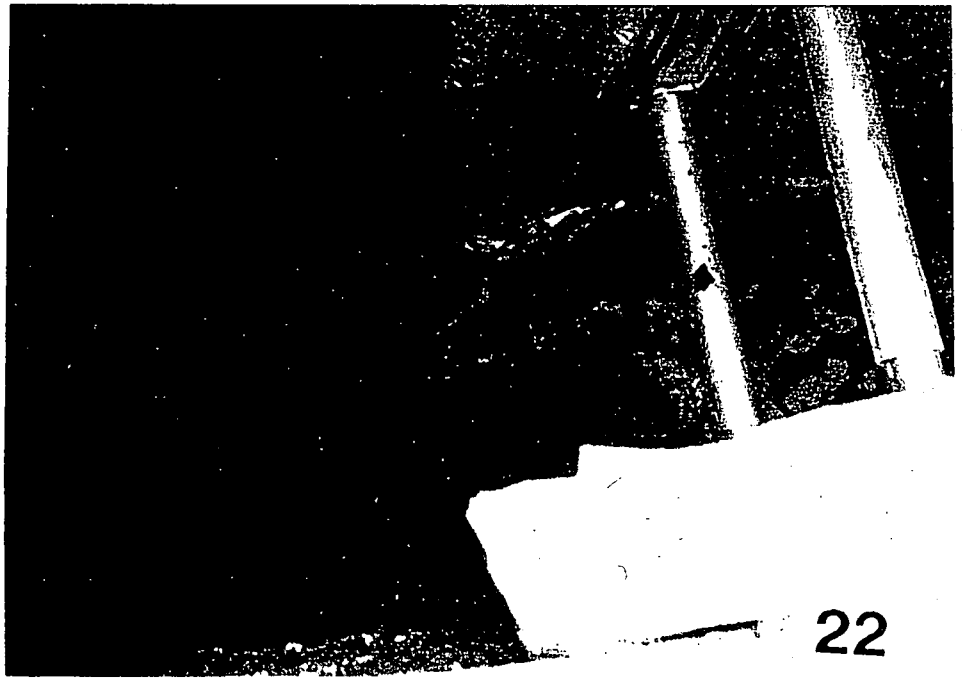


WATER IN EXCAVATION FROM OVERFLOWING MANHOLE - MIDDLE OF PROJECT

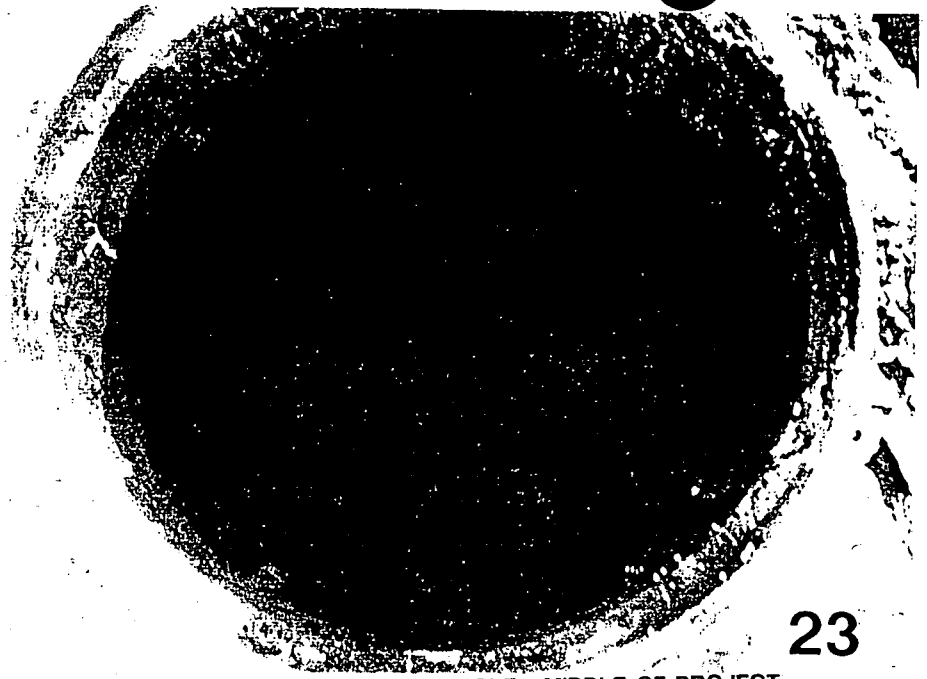


WATER DIVERSION FROM OVERFLOWING MANHOLE TO NEXT MANHOLE - MIDDLE OF PROJECT

WATER IN EXCAVATION FROM OVERFLOWING MANHOLE - MIDDLE OF PROJECT

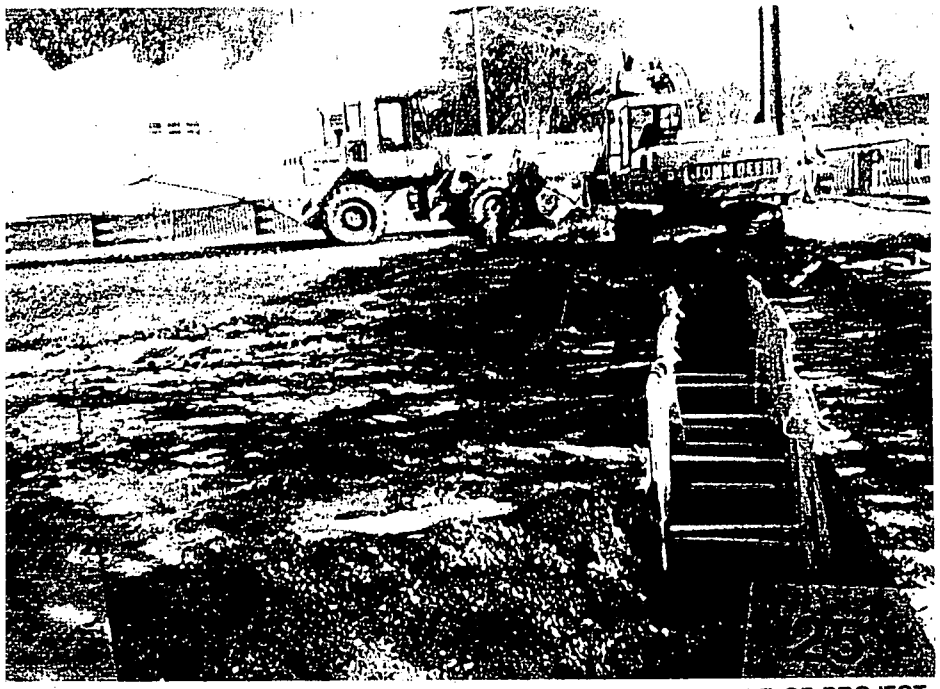


WATER IN EXCAVATION FROM OVERFLOWING MANHOLE - MIDDLE OF PROJECT

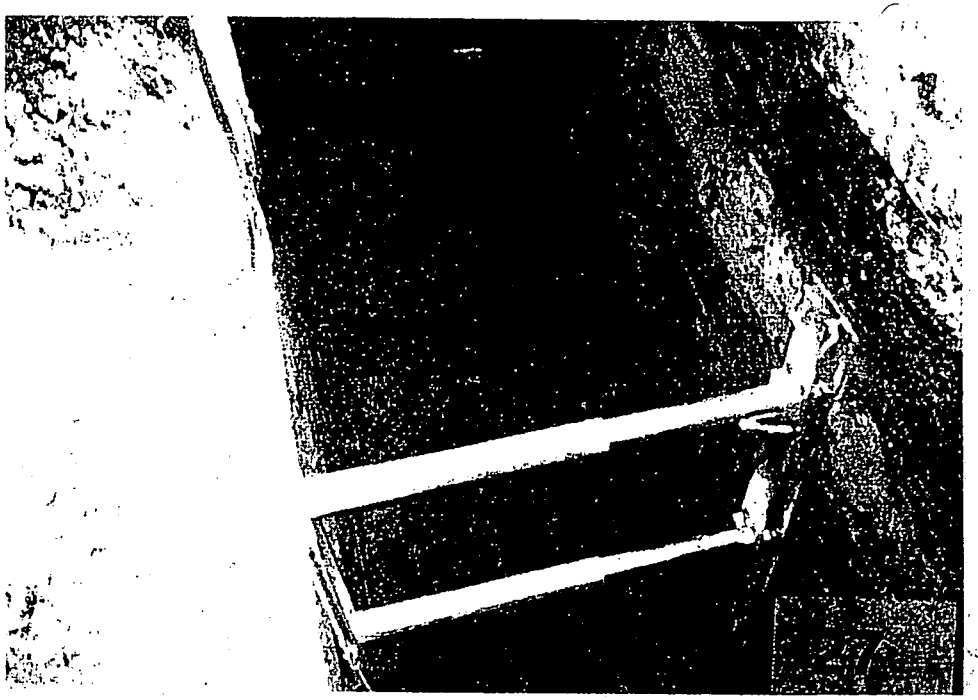


WATER BACKUP IN UPPER MANHOLE - MIDDLE OF PROJECT

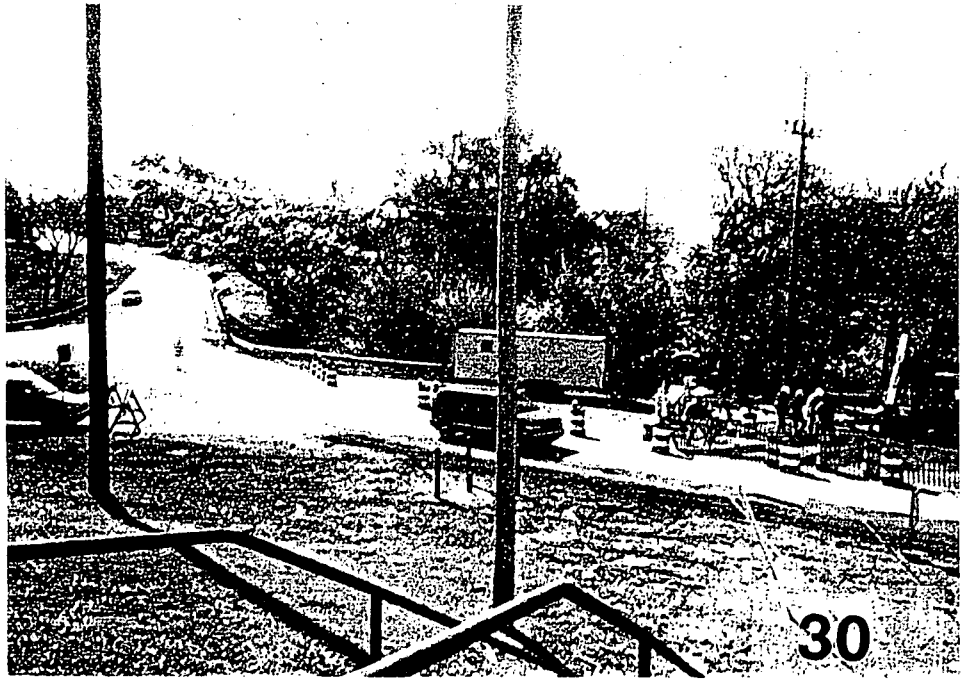
UNKNOWN



HYDRAULICALLY-JACKED ALUMINUM TRENCH SHORING - MIDDLE OF PROJECT

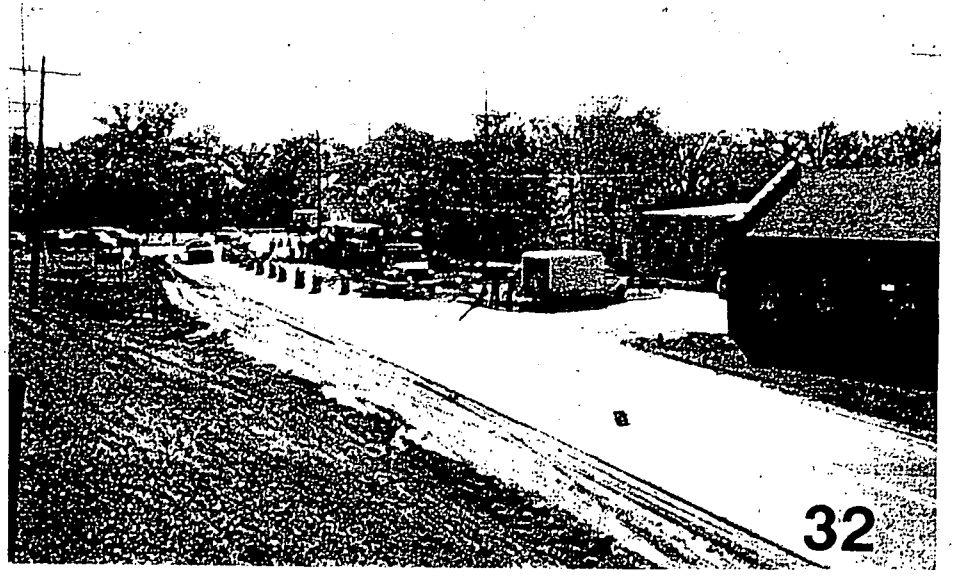


OLD SEWER LINE - MIDDLE OF PROJECT

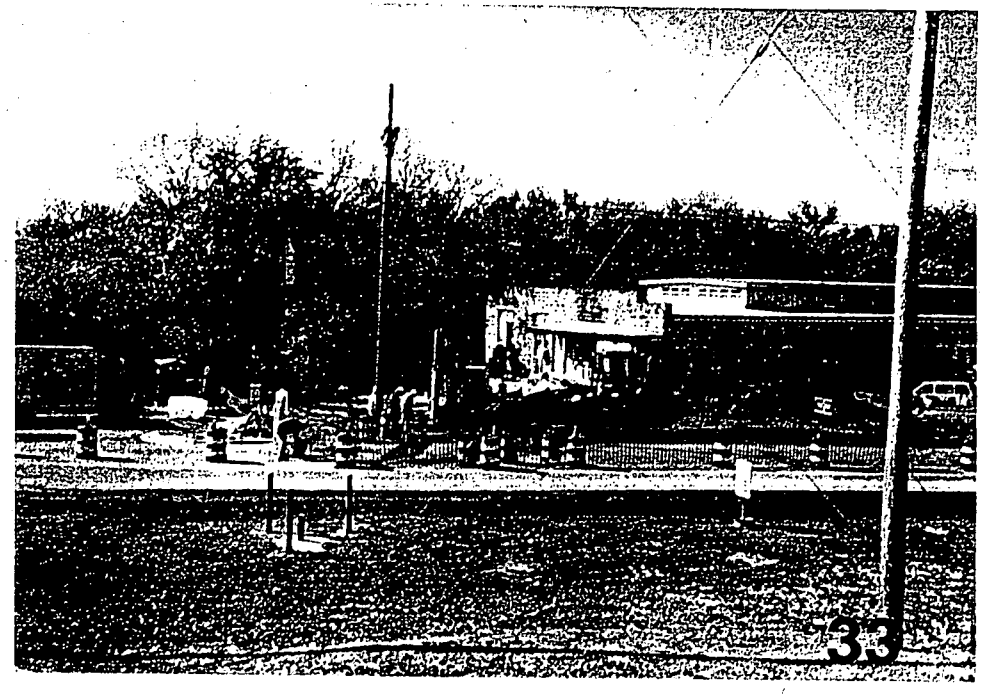


SITE OVERVIEW WITH TRAFFIC CONTROL - MIDDLE OF PROJECT

SITE OVERVIEW WITH TRAFFIC CONTROL - MIDDLE OF PROJECT



SITE OVERVIEW WITH TRAFFIC CONTROL - MIDDLE OF PROJECT



SITE OVERVIEW WITH TRAFFIC CONTROL - MIDDLE OF PROJECT

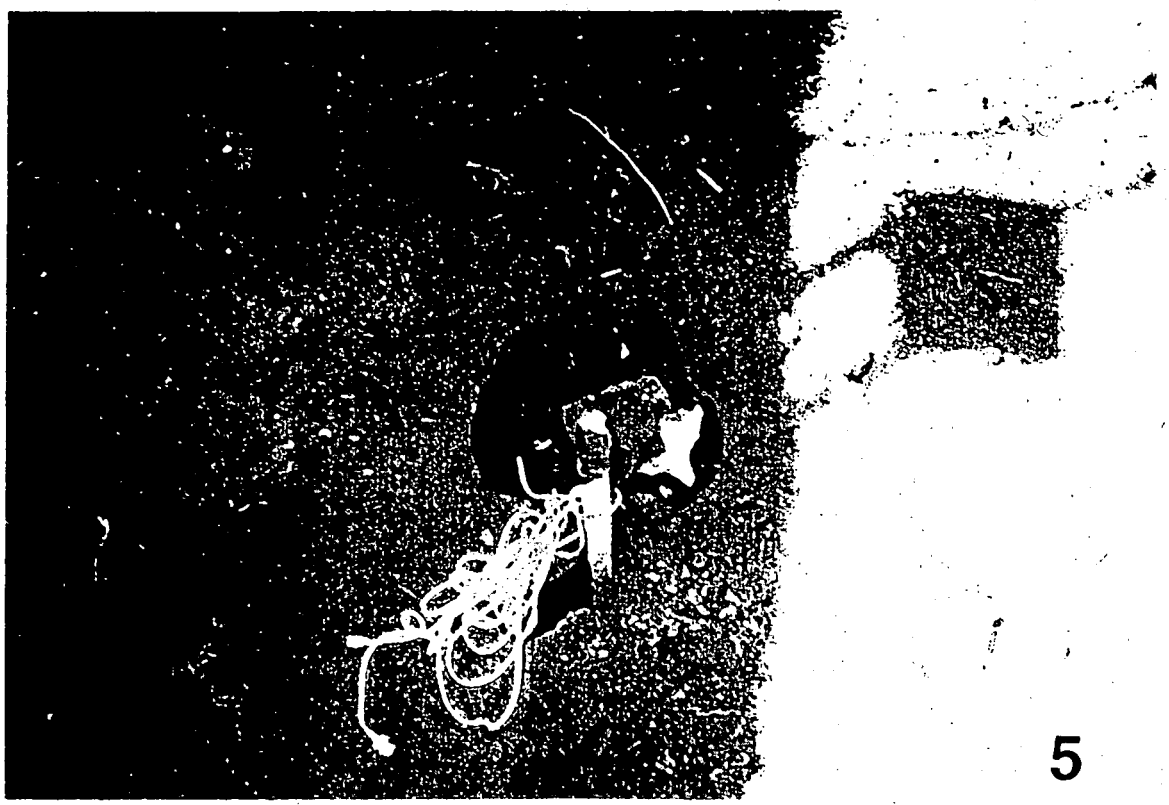
UST LOCATION _____

TOP OF UST - END OF MODIFICATION P00002

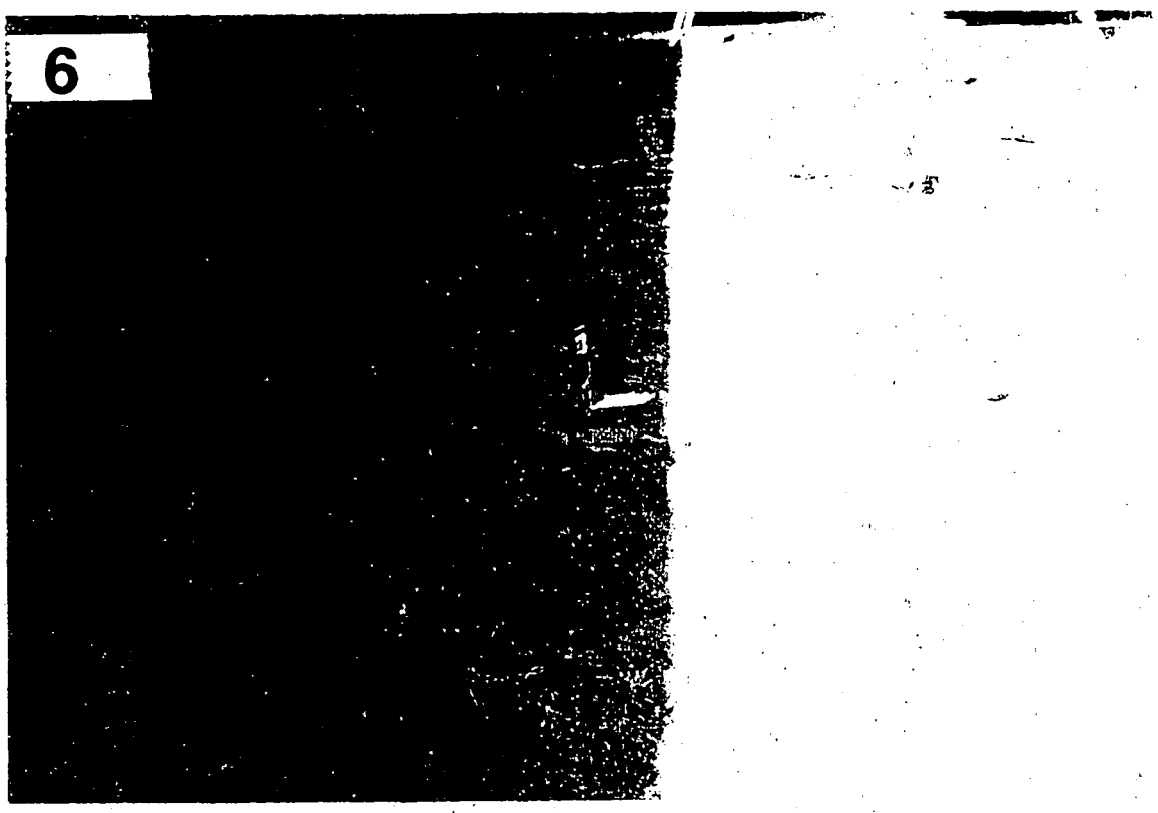
TOP OF UST - END OF MODIFICATION P00002

UST LOCATIONS - END OF MODIFICATION P00002

UST LOCATIONS - END OF MODIFICATION P00002

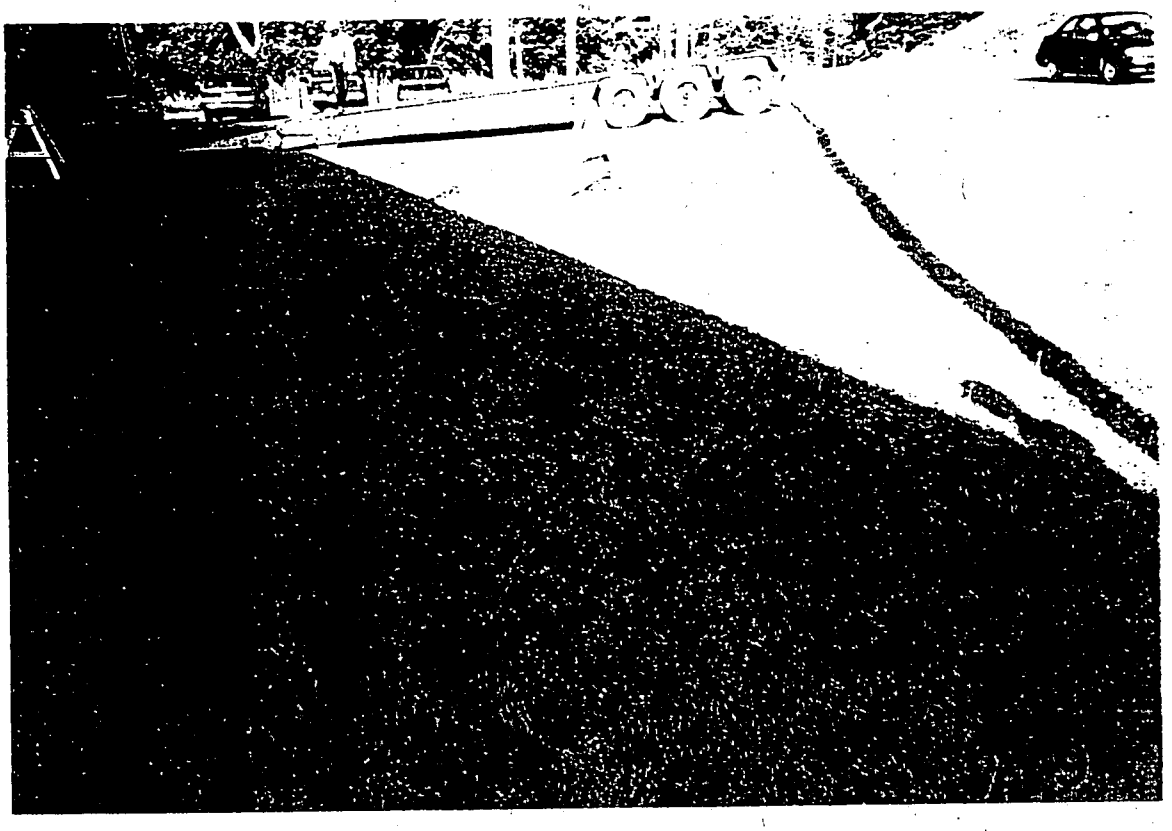


UST LOCATION - END OF MODIFICATION P00002



UST LOCATION - END OF MODIFICATION P00002

UST VENT PIPES - BEGINNING OF MODIFICATION P00002



GENERAL LOCATION OF USTs - BEGINNING OF MODIFICATION P00002

GENERAL LOCATION OF USTs - BEGINNING OF MODIFICATION P00002

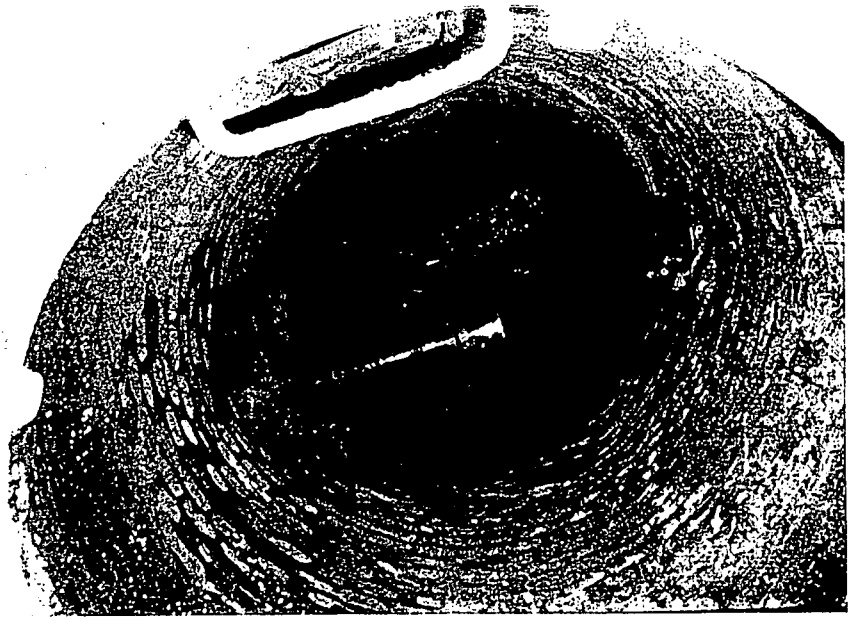
UST VENT PIPE - MIDDLE OF MODIFICATION P00002

GENERAL UST LOCATION - BEGINNING OF MODIFICATION P00002

NEW PHOTOS

SEWER LINE INSTALLATION - NEAR END OF PROJECT

WASHOUT NEAR LOWER MANHOLE - MIDDLE OF PROJECT



7

DROP INTO LOWER MANHOLE - NEAR END OF PROJECT

5

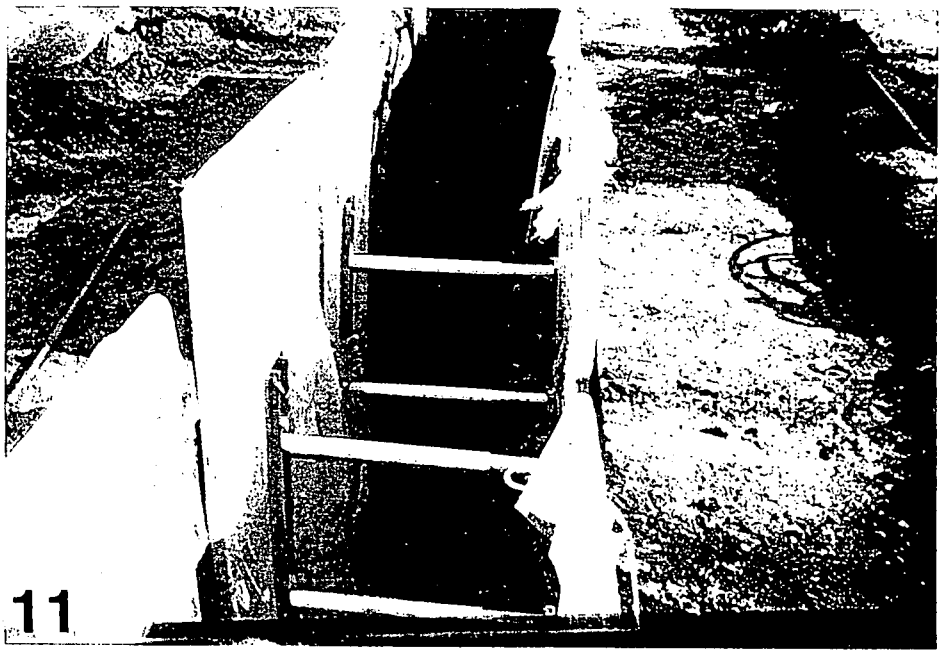
EXCAVATION NEAR THE LOWER MANHOLE - NEAR END OF PROJECT

8

EXCAVATION NEAR THE LOWER MANHOLE - NEAR END OF PROJECT

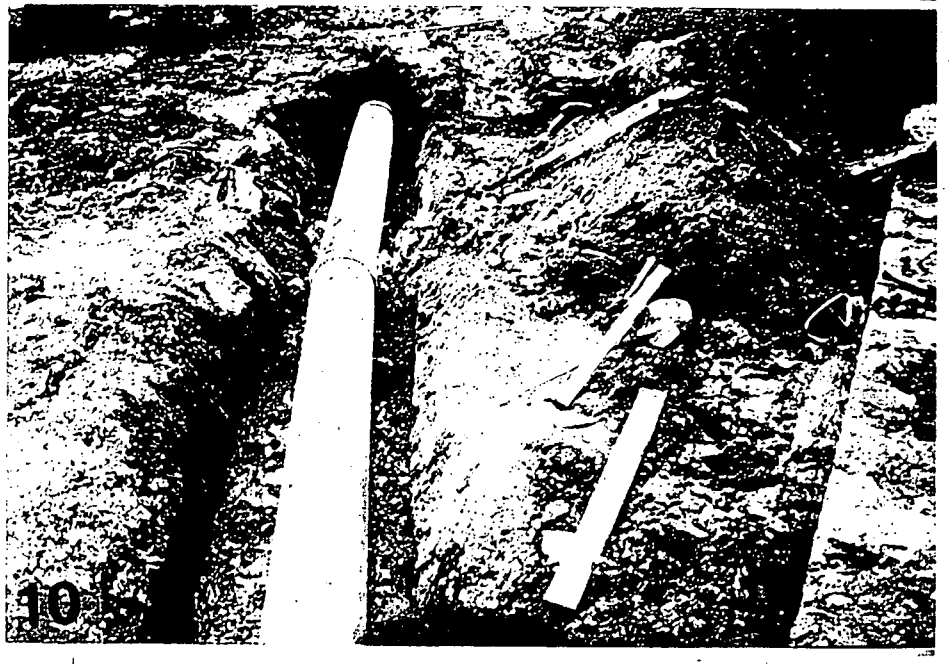
6

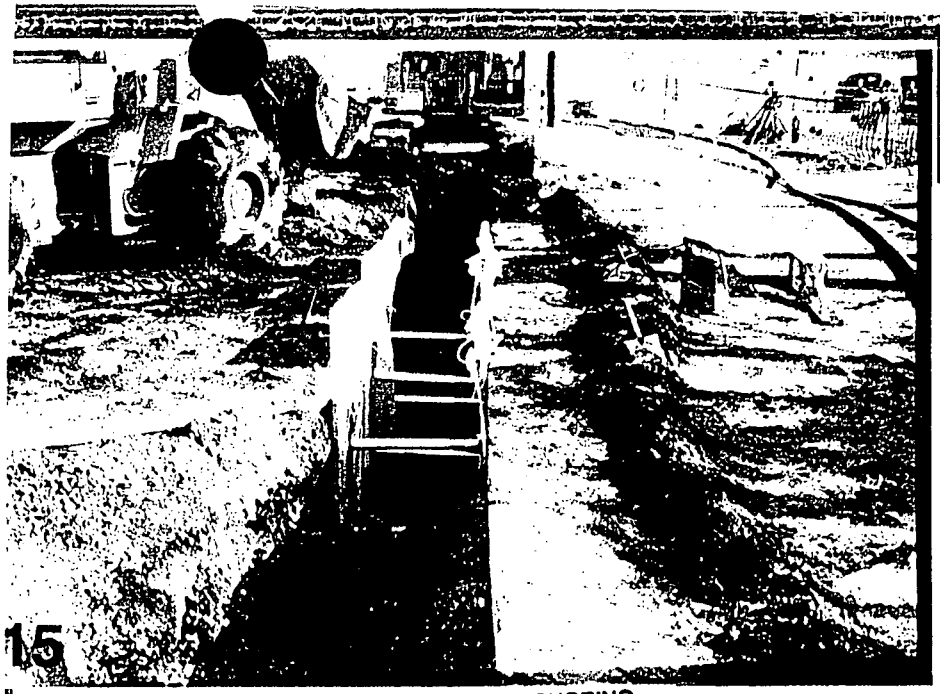
EXCAVATION AFTER THE MANHOLE OVERFLOWED - MIDDLE OF PROJECT



EXCAVATION AND SHORING - MIDDLE OF PROJECT

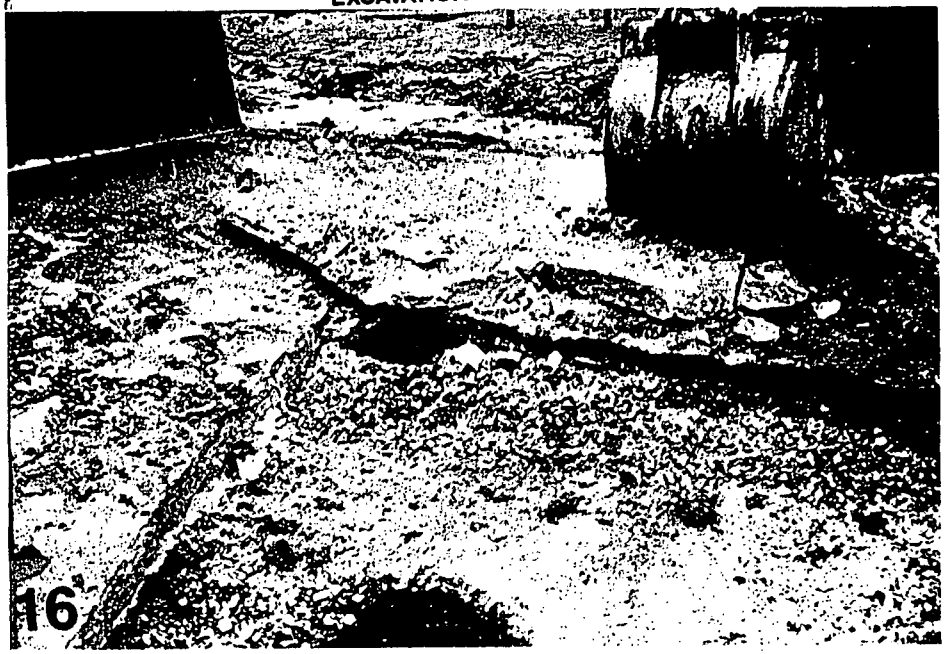
EXCAVATION AND SHORING - MIDDLE OF PROJECT





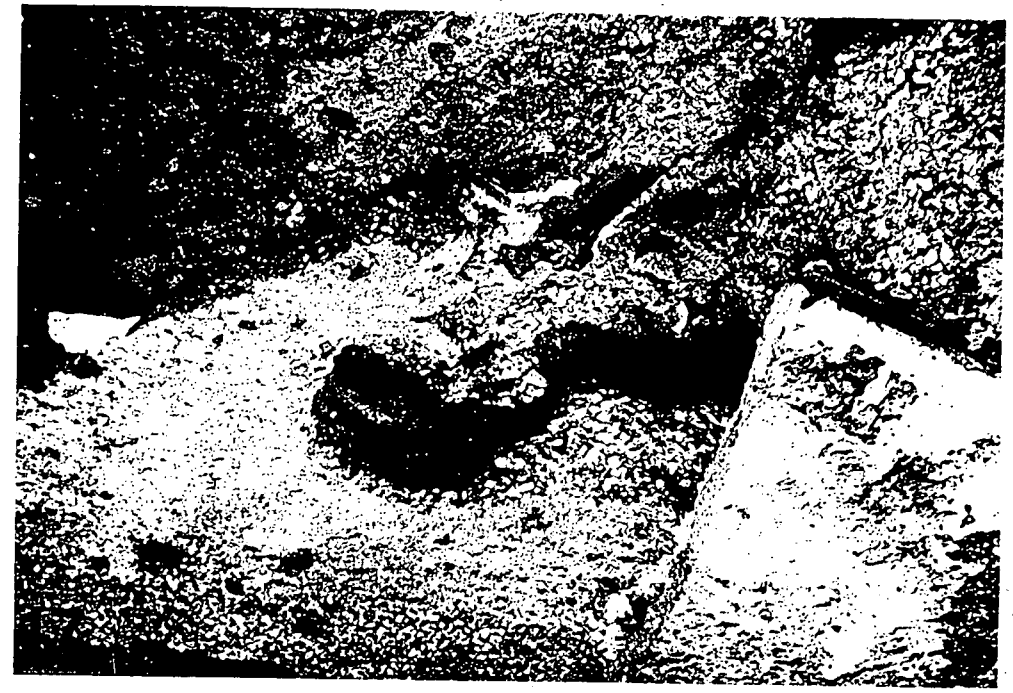
EXCAVATION AND SHORING

EXCAVATION NEAR LOWER MANHOLE - BEGINNING OF PROJECT



EXCAVATION NEAR LOWER MANHOLE - BEGINNING OF PROJECT

WATER INTRUSION - BEGINNING OF PROJECT



OLD SEWER LINE - MIDDLE OF PROJECT

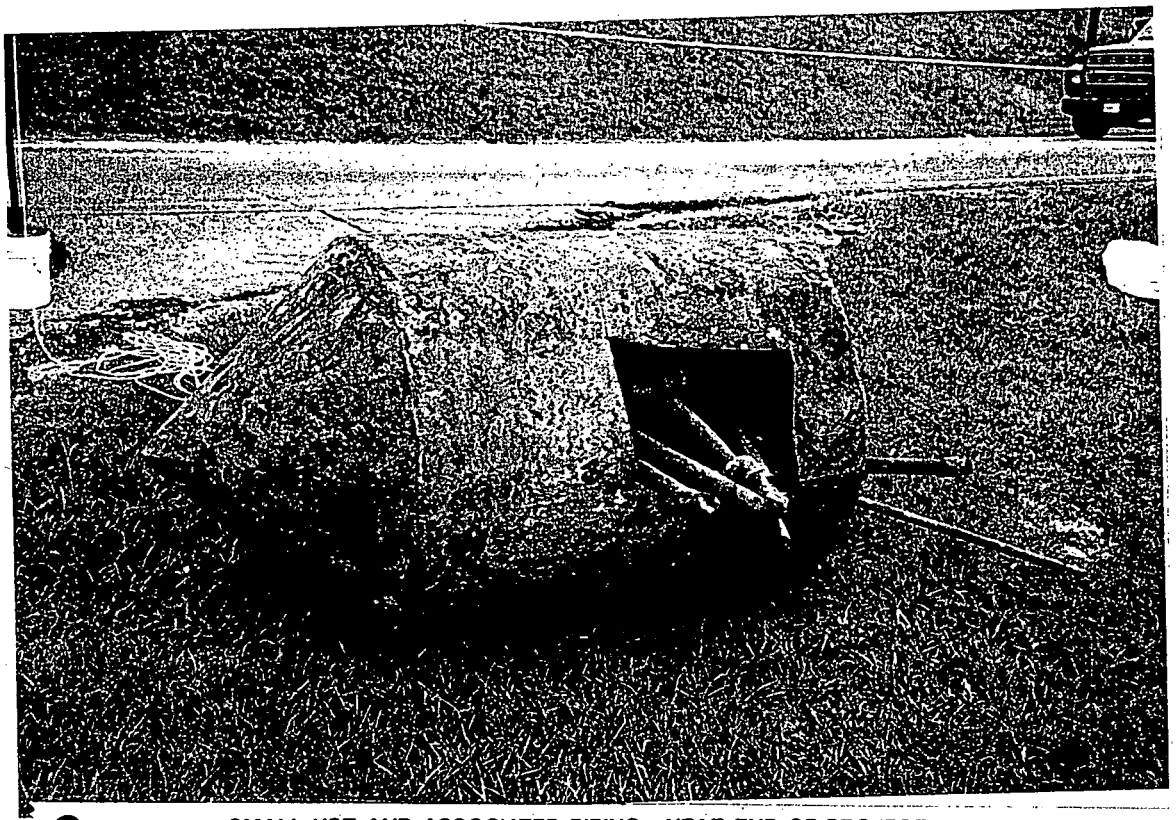
1 CAPPED VENT LINES - END OF PROJECT

2 CAPPED VENT LINES - END OF PROJECT

3 CAPPED VENT LINES - END OF PROJECT

4 FINAL GRADE - END OF PROJECT

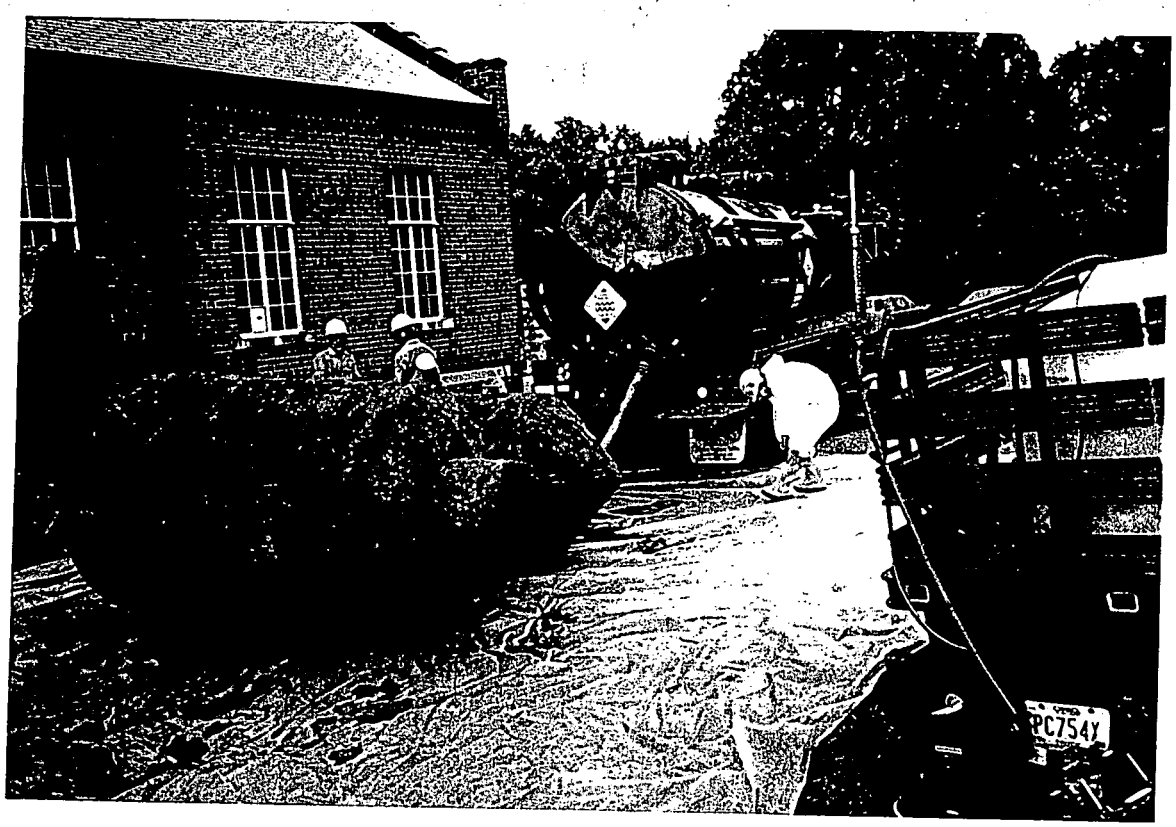
5 FINAL GRADE - END OF PROJECT



6 SMALL UST AND ASSOCIATED PIPING - NEAR END OF PROJECT

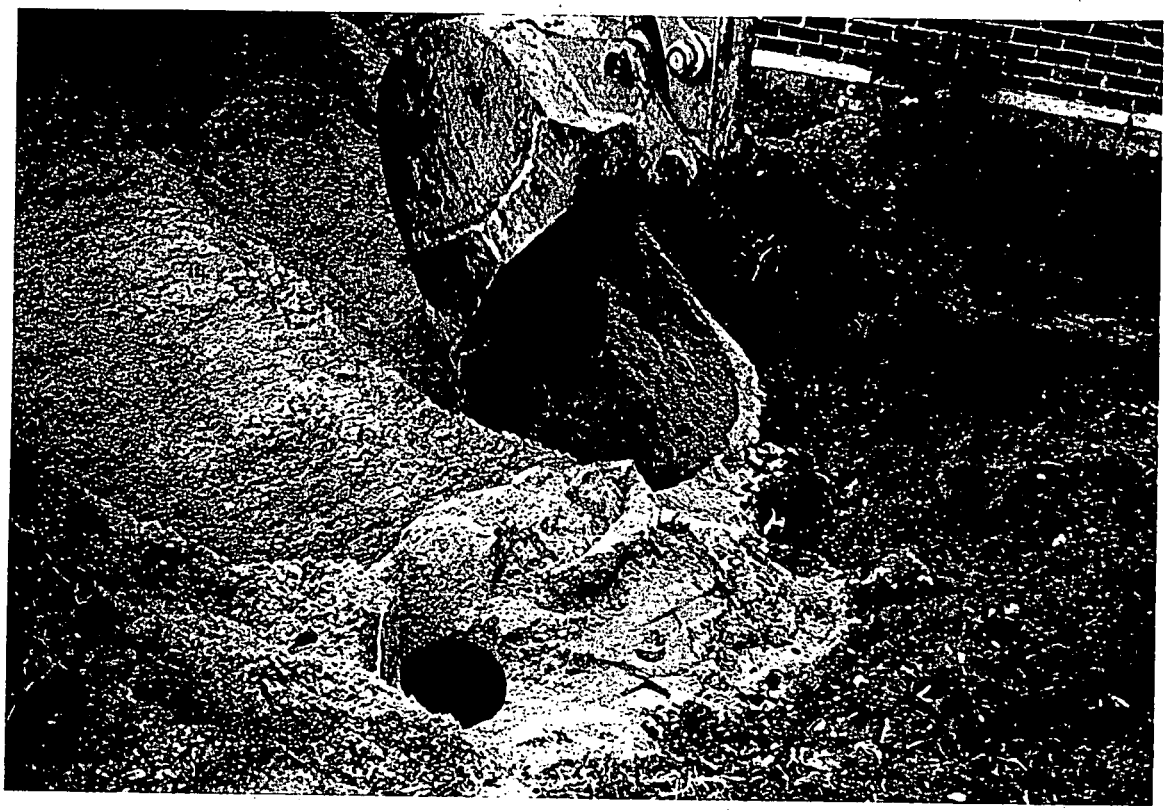
7 LARGER UST - NEAR END OF PROJECT

8 IN-PLACE ABANDONMENT OF LARGE UST - NEAR END OF PROJECT

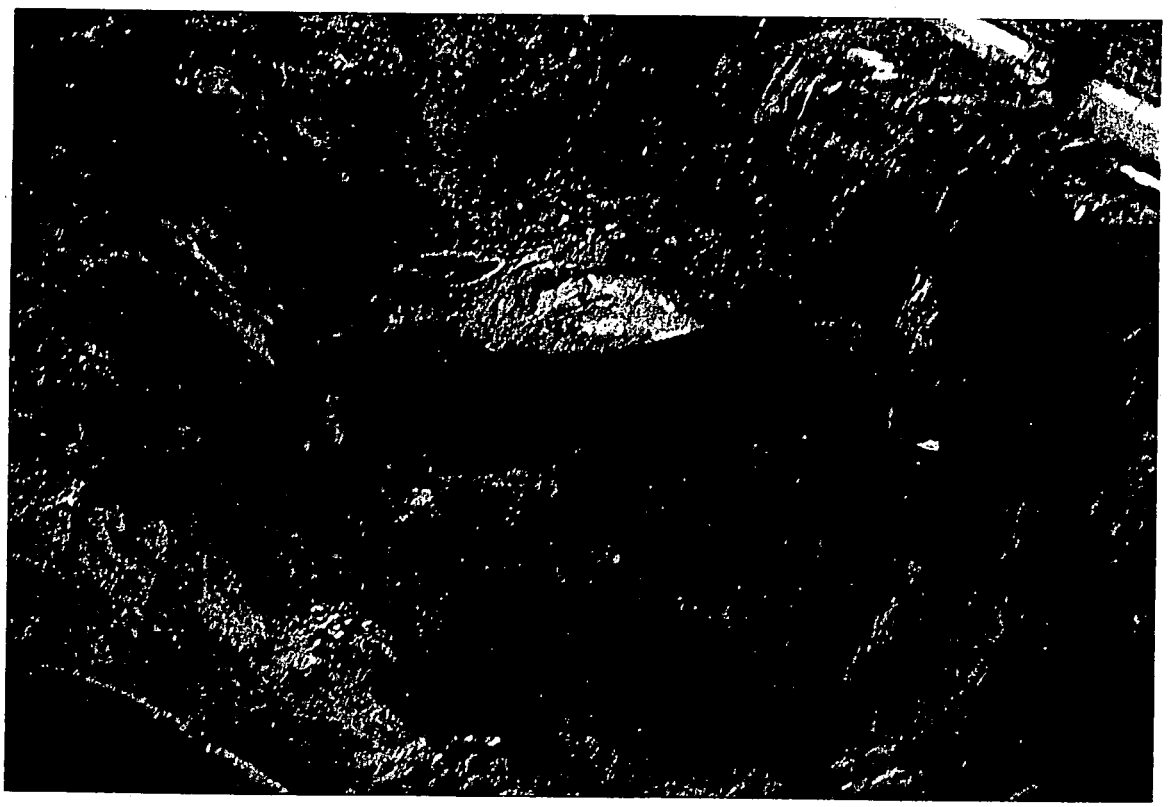


9 TWO USTs IN DECONTAMINATION AREA - NEAR END OF PROJECT

10 IN-PLACE ABANDONMENT OF LARGE UST - NEAR END OF PROJECT



11 IN-PLACE ABANDONMENT OF LARGE UST - NEAR END OF PROJECT



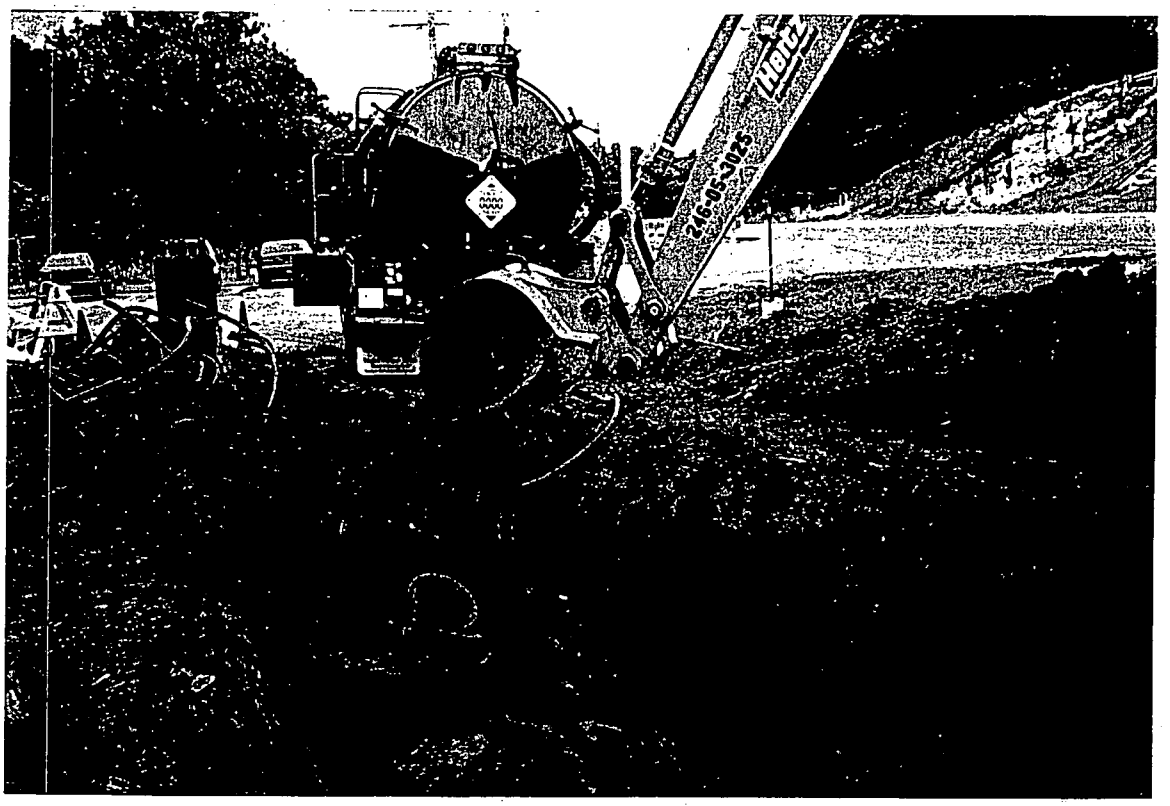
12 EXCAVATION NEAR LARGE UST - BEGINNING OF PROJECT

13 TOPS OF USTs AND PIPING - MIDDLE OF PROJECT

14 EXCAVATED USTs AND PIPING - NEAR END OF PROJECT

15

TOPS OF USTs AND PIPING - MIDDLE OF PROJECT



16

UST EXCAVATION - MIDDLE OF PROJECT

17 TOPS OF USTs AND PIPING - MIDDLE OF PROJECT

18 TOPS OF USTs AND PIPING - MIDDLE OF PROJECT

19

TOPS OF USTSs AND PIPING

APPENDIX H

CORRESPONDENCE

AFZN-DE-ED 5 May 1994

MEMORANDUM FOR Army Corps of Engineers, Attn: Mr. Bob Garner

SUBJECT: Laundry Sewer Line Repair

Request that the concrete encapsulated and filled VCP line running through the downstream manhole be removed. If the manhole is damaged upon removal of the line, that the manhole be repaired at the same time. We would like a finished operational product when the project is complete.

LARRY M. MCGEE
Chief, EP&S Division, DEH

APPENDIX L

CERTIFICATE OF DESTRUCTION

HESS & SONS SALVAGE INC.

Custom Car Crushing
We buy all types of scrap metal
NATIONWIDE WATS 1-800 825-4377 or (913) 238-3382

NNY HESS
RICK HESS

1209 N. Perry
P.O. Box 1263
Junction City, KS 66441

July 21, 1994

Gearld Resnik
OHM Corporation
P.O. Box 551
Findlay, OH. 45839-0551

Re: Ft. Riley Project--Job #15747

To Whom It May Concern:

On Friday, July 15, 1994, there was 1-300 gal tank, 1-500 gal. tank and some piping brought to the Hess & Sons Salvage.

We obtained all of the material brought to us and then it was cut up and sold as scrap iron.

Please accept this letter as a letter of destruction of all material which you brought to Hess & Sons Salvage. If you have any questions, please feel free to contact me at 1-800-825-4377 at which time I will be happy to help you in anyway I can.

Cordially,

Rick Hess

Rick Hess
Hess & Sons Salvage

APPENDIX K

RECORD OF COMMUNICATION - ROLL-OFF DISPOSAL

dex740 P001

COMMUNICATION RESULT REPORT

913 239 8535 FT. RILEY DEH ENV&NR 07-11-94 09:52AM

FILE	DATE & TIME	FILE TYPE	DELAYED	DESTINATION/TO:/FROM:	PAGE	REMARKS		SIZE
:7	07-11 09:50AM	MEMORY-S		TO :CEMRO FT CROOK AREA	01			0022

PHONE / TTI NO.	COMM MODE	RESULT	NO.	PHONE / TTI NO.	COMM MODE	RESULT
065:CEMRO FT CROOK A		GOOD				

Note The
2- Rolloff's From
ETS ~~will~~ will Be
disposed @
Construction debris
Landfill on
Thursday 7-21-94
↳ USACE Bob Garner
will Be on
site
for
This

For Jim O'Neil
Ft Crook Area Office
Offutt AFB

fm Janet Wade
Ft Riley Env & Nat Res. Div., DEH

Info re: arrangements to empty roll off's
our Construction/Demolition Landfill

(I'll give to Bob Garner when he gets
here)

C/D Landfill
Warren Joesph
Margret "Angel" Hostetter
223-1997 mobile phone

DEPARTMENT OF THE ARMY
HEADQUARTERS, 1ST INFANTRY DIVISION (MECH) AND FORT RILEY
FORT RILEY, KANSAS 66442-5000

June 23, 1994

REPLY TO ATTENTION OF:

Directorate of Engineering & Housing
Environmental & Natural resources
Division (AFZN-DE-V)

SENT VIA FACSIMILE (6/22/94)

Mr. Tom Gross
Solid Waste Management Unit
Kansas Department of Health & Environment
Forbes Field, Building 740
Topeka, Kansas 66620-7500

Dear Mr. Gross:

As we discussed on June 20, 1994, Fort Riley is seeking concurrence from your agency to dispose of the contents of two rolloff containers full of soil and construction debris from a sanitary sewer line repair job completed in May 1994 into the Construction/Debris Landfill at Fort Riley. The repaired line runs directly through a site referred to as Dry Cleaning Facilities (DCF) which is currently undergoing a Remedial Investigation/Feasibility Study (RI/FS) to address soils and groundwater contaminated with perchloroethylene (PCE). As requested, attached are the TCLP and total VOC analysis from a composite sample representing the content of the containers. Also enclosed is a figure indicating PCE contours in the area of concern. Please be aware that the sewer line lies 7 feet below grade.

Please provide your decision on the request by June 30, 1994. If you have questions or comments, please contact Katie Watson or Debbie Hazelbeck at (913) 239-3962.

Larry D. Ness
Chief, Environmental Branch

Encl

Copies Furnished:
KDHE (Victoria Silva)
AFZN-DE-V (Janet Wade)
AFZN-DE-V (Debbie Hazelbeck)
CEMRO-ED-ER (Joe Sheilds)
CEMRO-CD-FC (Jim O'Neill)

Date 5 July 94
2:30PM

ROUTING AND TRANSMITTAL SLIP

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Katie		
2.	JW	7/5
3.		
4.		
5.		

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate	X	For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

Bob Kinder, Environmental Tech with KDHE has given verbal approval to dispose of the soil and construction debris from a sanitary sewer line in the CIP landfill. No written approval will be forwarded. This decision pertains to your letter dated 6/22/94.
23

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Debbie Hylbeck	Phone No. 8652

5041-102

GPO : 1990 0 - 276-978

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

Called Jim O'Neil, MRO 7/5/94 1600 left message

APPENDIX M

ASSOCIATED ENVIRONMENTAL, INC. PAPERWORK

JUL 28 1994

ASSOCIATED ENVIRONMENTAL, INC.

701A Pecan Circle Manhattan, Kansas 66502
PHONE: (913) 776-7755 * FAX: (913) 776-9555

July 25, 1994

Jerry Resnik
OHM Remediation Services Corp.
Midwest Region
CS 2800
Findlay, OH 45839-2800

Re: Fort Riley, Kansas UST Removals

Dear Mr. Resnik:

Please find enclosed your copy of the Permeanent Tank Abandonment forms for the UST removal completed at Fort Riley, Kansas.

Also, please find enclosed our invoice #2005 for providing a State of Kansas UST certified person to oversee operations. Also, Associated Environmental, Inc. provided soil sample jars which is included in the invoice.

If you have any questions, regarding either of these submittals, please contact us.

Associated Environmental, Inc. appreciates the opportunity to provide our services to you. If any other opportunities arise in which we may be of service to you in Kansas, please let us know.

Sincerely,
Associated Environmental, Inc.

Dee Johnson

Dee Johnson
Office Manager

PERMANENT TANK ABANDONMENT

Submit to: Kansas Dept. of Health and Environment
Bureau of Environmental Remediation
Underground Storage Tank Section
Forbes Field, Bldg. 740, Topeka, Kansas 66620

Please Print Clearly or Type

I. Tank Owner Name Ft Riley Owner ID.#

Address Bldg 1970 (street) Camp Funston (city) KS (state) 66442 (zip)

Contact Name Abdul Al-Assi Telephone # 8615

II. Facility Name Bldg 181 Facility ID.#

Facility Address Fort Riley (street) KS (city) Geary (county)

III. Please provide information about the tanks being taken out of service:
See diagram on Back

	1	2	3
A. Age of tanks (in years)	Unk	Unk	Unk
B. Tank Capacity	300	500	5000
C. Tank Material	steel	steel	steel
D. Substance last stored	Unk	Unk	Unk
E. Tank Removal Date	7/14/94	7/14/94	7/15/94
F. Method of abandonment (please circle)	filled or (removed)	filled or (removed)	(filled) or removed

G. If the tanks are filled in place, please indicate the material used:
sand ✓ cement ___ gravel ___ other ___ Tank #3

If other, please specify. ___

H. If tanks were removed, describe tank disposal. Tank #1 & #2 cut up for scrap - Disposal: Hess & Son's Scrape Metal - Junction City, KS.

I. Who performed the site assesment required by law? KDHE ✓ other ___

If other, please specify. ___

J. Were the tanks abandoned because of a release? yes ___ no ✓

K. Have these tank(s) been registered with KDHE? yes ___ no ✓

V. How many active tanks are there remaining at this facility? Ø at Bldg 181

Abandonment Contractor Associated Environmental, Inc /OHM

Contact BRAD JOHNSON Telephone 913/

I certify that the tanks were abandoned in accordance with all federal, state and local regulations.

Bradley Johnson (signature) 7/18/94 (date)

AUG - ? 1994

ASSOCIATED ENVIRONMENTAL, INC.

701A Pecan Circle Manhattan, Kansas 66502
PHONE: (913) 776-7755 * FAX: (913) 776-9555

August 1, 1994

Jerry Resnik
OHM Remediation Services Corp.
Midwest Region
CS 2800
Findlay, OH 45839-2800

Re: Fort Riley, Kansas UST Removals

Dear Mr. Resnik:

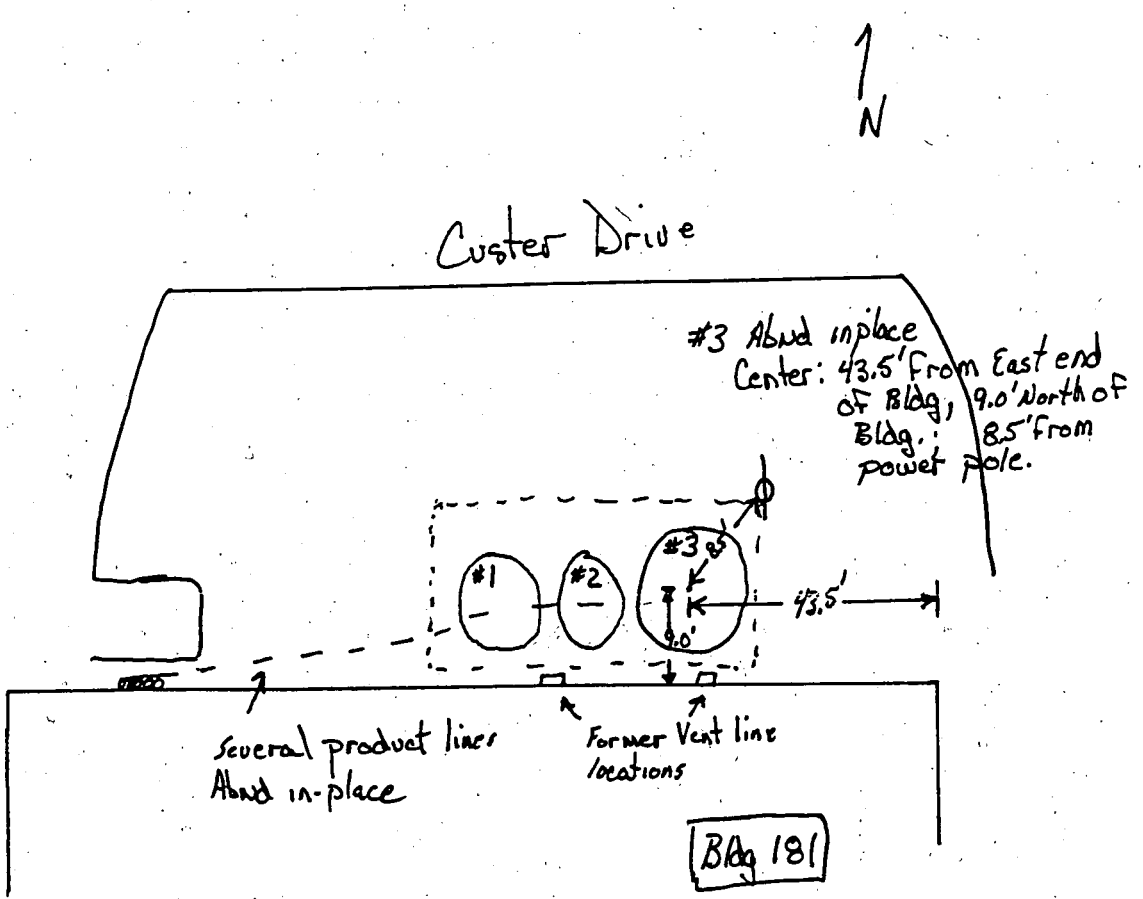
Please find enclosed a copy of the sketch of the site for the Permeanent Tank Abondonment form for the UST removal completed at Fort Riley, Kansas. I sent you the original form last week but failed to copy the back side.

If you have any quesitons regarding this submittal, please contact me at 913-776-7755.

Sincerely,
Associated Environmental, Inc.

Dee Johnson

Dee Johnson
Office Manager


N
Custer Drive
#3 Abnd in place
Center: 43.5' from East end of Bldg, 9.0' North of Bldg.; 8.5' from power pole.
#1
#2
#3
43.5'
9.0'
Several product lines Abnd in-place
Former Vent line locations
Bldg 181

NOT to SCALE

APPENDIX N

CATEGORY III SUBMITTALS

OHM Corporation

April 27, 1994

U.S. Army Corps of Engineers
ATTN: Kevin Birkett
P.O. Box 13287, Bldg. 527
Fairchild Hall, 3rd Floor
Offutt AFB, NE 68113

RE: Sewer Line Material Specifications
Contract # DACW45-89-D-0506
Delivery Order #3
OHM Job Number 15747

Dear Mr. Birkett:

Attached please find the proposed sewer line material specs. for the aforementioned project.

If you have any questions regarding this, feel free to call me at 419-424-4940.

Sincerely,

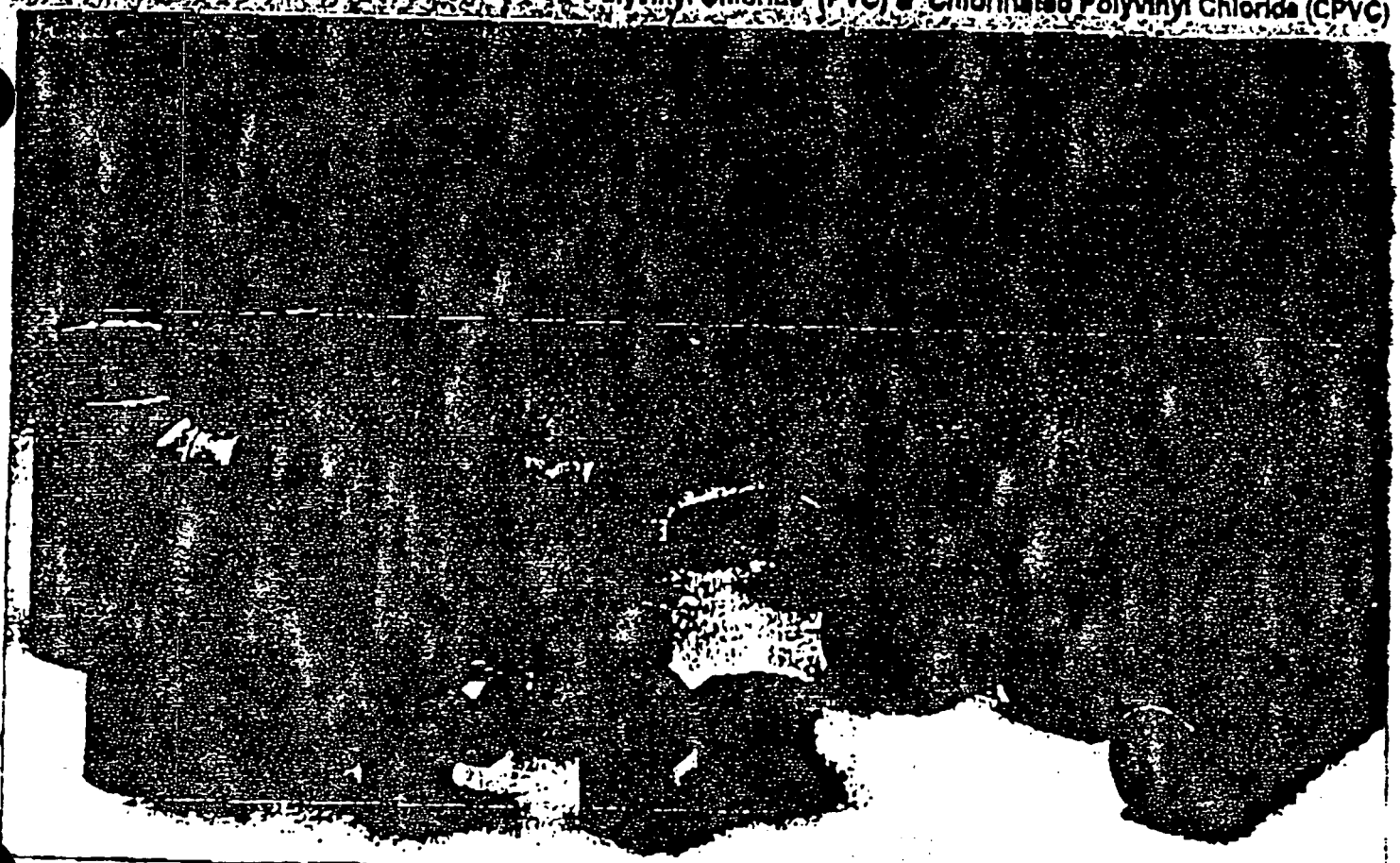
Gerald S. Resnik
Project Manager

pc: Jim Darnall
Project 15747

16406 U.S. Route 224 East ■ P.O. Box 551 ■ Findlay, Ohio 45839-0551 ■ 419-423-3526

Hi-Strength Schedule 80 Fittings and Pipe

Polyvinyl Chloride (PVC) & Chlorinated Polyvinyl Chloride (CPVC)

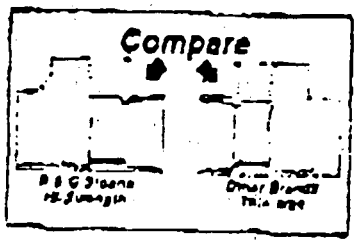


Benefits of GSR Hi-Strength Schedule 80 Fittings and Pipe

- Available in PVC and CPVC.
- PVC handles temperatures to 140°F
- CPVC handles temperatures to 210°F.
- Stronger performance.
- High chemical and corrosion resistance.
- Lower installed cost.
- Maintenance free internal and external surfaces.

Stronger Fittings

The GSR Hi-Strength Schedule 80 fitting design puts extra material at the points of greatest stress concentration. Quick burst and long term tests show most tee and elbow failures occur in the crotch area and side walls. Conversely, little or no stress occurs in the socket walls since these areas are reinforced by the pipe inside them. Thus, by thickening the crotch



and side walls (as shown in the diagram) the ability of the fitting to withstand pressure is substantially improved.

In fact, quick burst tests reveal GSR Hi-Strength Schedule 80 fittings are at least 10% stronger than conventionally designed tees, 6.8% stronger than conventionally designed ells and 5.7% stronger than conventionally designed couplings.

Outstanding Chemical Resistance

PVC and CPVC thermoplastics are highly resistant to acids, alkalis, alcohols and many other corrosive materials. Both materials are ideal for process piping installation and most service piping applications.

CPVC Offers Higher Temperature Rating

Engineers and contractors can now specify GSR Schedule 80 fittings and pipe made from CPVC high temperature thermoplastic. CPVC is capable of handling water supplies, hot water and process piping applications at any temperature up to 210°F.

Higher Flow Rating

Smooth interior walls result in lower pressure loss and higher volume. (Hazen Williams C Factor = 150)

Maintenance Free Service

CPVC and PVC thermoplastics will not rust, scale, pit or corrode, nor are they subject to electrolysis. You are assured many years of leak-free maintenance-free service. For buried applications, CPVC and PVC are not affected by soil conditions. Painting is not required for indoor non-exposed installations. For outdoor, sunlight exposed installations, painting with two coats of white colored water base latex paint provides added protection.

Lower Installed Cost

Both PVC and CPVC have installed costs which are substantially lower than with stee alloys or lined steel and are competitive with carbon steel. Solvent cemented connections contribute to lower installed costs. The much lighter weight (about one-sixth as much as steel) speeds and simplifies handling during installation.

Versatility and Dependability

PVC and CPVC fittings and pipe have been found suitable for more than 90% of the corrosive and non-corrosive applications within the chemical process industry.

R&G SLOANE

INSTALLATION INFORMATION

RECOMMENDATIONS FOR INSTALLERS AND USERS:
Plastic piping systems should be **ENGINEERED, INSTALLED,** and **OPERATED** in accordance with **ESTABLISHED DESIGN AND ENGINEERING STANDARDS AND PROCEDURES** for plastic piping systems. Suitability for the intended service application should be determined prior to installation.

SOLVENT WELD CONNECTIONS — Use a quality grade of primer and solvent cement formulated for the type of connection, with the **CORRECT SIZE APPLICATOR.** Read and follow all of the solvent cement **MANUFACTURER'S APPLICATION INSTRUCTIONS.**

THREADED CONNECTIONS — Spears Manufacturing Company recommends the use of a quality grade Teflon tape. Choice of either Teflon tape, paste, or other pipe joint compound is at the discretion of the installer. The manufacturer's literature for these products should be reviewed for proper selection and application procedures. **WARNING: SOME PIPE JOINT COMPOUNDS OR TEFLON PASTES MAY CONTAIN SUBSTANCES THAT COULD CAUSE STRESS CRACKING TO PLASTIC.**

1 to 2 turns beyond **FINGER TIGHT** is generally all that is required to make a sound plastic threaded connection. Unnecessary **OVERTIGHTENING** will cause **DAMAGE TO BOTH PIPE AND FITTING.**

FLANGE MAKE-UP — Once a flange is joined to pipe, the method for joining two flanges is as follows:

A. Piping runs joined to the flanges must be installed in a straight line position to the flange to avoid stress at the flange due to misalignment. Piping must also be secured to prevent lateral movement which can create stress and damage the flange.

B. Align the bolt holes of the mating flanges by rotating the ring into position.

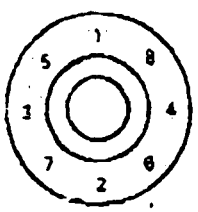
C. Insert all bolts.

D. Make sure the faces of the mating surfaces are not separated by excessive distance prior to bolting down the flanges.

E Tighten the bolts on the plastic flanges by pulling down the nuts diametrically opposite each other using a torque wrench. Tighten bolts according to sequence shown in diagram. Completed tightening should be accomplished in stages and the final torque values followed according to the size of the flange. See torque chart for recommended torque. Uniform pressure across the flange will eliminate leaky gaskets.

CAUTION: UNNECESSARY OVERTORQUING WILL DAMAGE THE FLANGE

The following tightening sequence is suggested for the flange bolts.



FLANGE SIZE	RECOMMENDED TORQUE
½-1¼"	10-15 Ft. Lbs
2-4"	20-30 Ft. Lbs.
6-8"	33-50 Ft. Lbs.
10"	53-75 Ft. Lbs.
12"	80-110 Ft. Lbs.

Bolts and Gaskets are not furnished.

FLANGE SIZE	BOLT HOLES	BOLT DIAMETER	BOLT LENGTH (MINIMUM)
½	4	½	2½
¾	4	½	2½
1	4	½	2½
1¼	4	½	2½
1½	4	½	3.0
2	4	⅝	3.0
2½	4	¾	3½
3	4	⅝	3½
4	8	⅝	3½
5	8	¾	4.0
6	8	¾	4½
8	8	⅞	5.0
10	12	⅞	5½
12	12	⅞	5½

Based on use of two full washers and ⅛ Thick Gasket

NORMALLY A NEOPRENE FULL FACE GASKET, ⅛" THICK, IS RECOMMENDED. MORE RESISTANT GASKET MATERIALS SHOULD BE USED ON SYSTEMS HANDLING HIGHLY AGGRESSIVE CHEMICALS.

IMPORTANT

WATER HAMMER — Spears Manufacturing Company, Inc., recommends that all PVC and CPVC plastic piping systems be designed and constructed to **AVOID EXCESSIVE WATER HAMMER.** Water hammer can cause damage, and failure to pipe, valves, and fittings within the piping system.

Spears Manufacturing Company **DOES NOT RECOMMEND** the use of thermoplastic piping products for systems to transport or store compressed air or gases, or the testing of thermoplastic piping systems with compressed air or gases in above and below ground locations. The use of our product in exposed, compressed air or gas systems automatically voids our warranty for such products and its use against our recommendation is entirely the responsibility and liability of the installer.

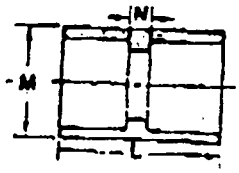
Spears Manufacturing Company will not accept responsibility for damage or impairment of its products or other consequential or incidental damages caused by

SCHEDULE 80 PVC & CPVC

DIMENSIONAL AND WEIGHT DATA

(For CPVC weights multiply by 1.1

COUPLING



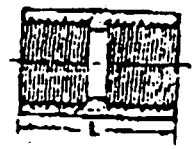


FIG 829
S x S

FIG. 830
T x T

SIZE	SIZE CODE	L SLIP	L THREAD	M	N	WEIGHT — LBS. FIG. 829	WEIGHT — LBS. FIG. 830
1/4	002	1 3/8	1 15/16	27/32	1/8	0.022	0.023
3/8	003	1 5/8	1 15/32	1.0	1/8	0.033	0.035
1/2	005	1 27/32	1 19/32	1 7/32	3/32	0.047	0.065
3/4	007	2 1/8	1 23/32	1 1/2	3/32	0.096	0.086
1	010	2 7/8	2 1/16	1 13/16	3/32	0.150	0.145
1 1/4	012	2 15/32	2 7/32	2 3/16	3/32	0.227	0.218
1 1/2	015	2 7/8	2 1/2	2 1/2	5/16	0.303	0.261
2	020	3 1/8	3.0	3.0	5/16	0.423	0.342
2 1/2	025	3 13/16	3 11/32	3 3/4	1/4	0.641	0.675
3	030	4 7/32	3 15/32	4 3/16	1/4	0.829	0.958
4	040	5 5/16	3 21/32	4 23/32	1/8	1.416	1.468
6	060	6 1/4	—	7 21/32	1/4	3.412	—
8	080	8 3/8	—	9 3/4	1/4	6.640	—

REDUCING COUPLING

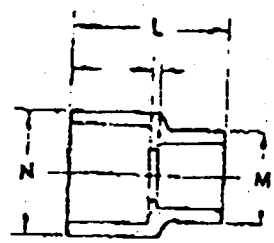


FIG 829-1
S x S

SIZE	SIZE CODE	M	N	L	WEIGHT LBS.
3/4 x 1/2	101	1 5/32	1 3/8	1 31/32	0.064
1 x 3/4	131	1 13/32	1 23/32	2 11/32	0.101
1 1/4 x 1	168	1 3/8	2 3/32	2 11/16	0.176
1 1/2 x 1 1/4	212	2 3/32	2 3/8	2 3/4	0.211
2 x 1 1/2	251	2 11/32	2 13/16	2 15/16	0.304
4 x 2	420	2 7/8	5 9/32	3 7/8	1.151

Selection Data – Hi-Strength Schedule 80 PVC & CPVC Fittings

Physical & Thermal Properties

	PVC	CPVC
Specific Gravity	1.4	1.54
Izod Impact Strength (ft. lbs/inch of notch)	0.8	1.7
Tensile Modulus, psi	4.2×10^5	4.23×10^5
Ultimate Tensile Strength, psi	7200	8000
Working Stress @ 73°F, psi	2000	2000
Working Stress at Upper Temperature Limit	440	320
Upper Temperature Limit	140°F	210°F
Hazen Williams "C" Factor	150	150
Coefficient of Linear Expansion 10^{-5}in/in°F	3.0	3.8
Thermal Conductivity BTU/hr/ft²/in/°F	1.10	.96

Flammability — Burns only when in contact with ignition source.

Compressed Air or Gases

R & G Sloane strongly recommends against testing assembled PVC or CPVC piping systems with compressed air or other compressed gases and against using PVC or CPVC systems for distribution of compressed air or gases.

Chemical Resistance of PVC and CPVC

Weak acids	Resistant
Strong acids	Resistant in most situations
Weak bases	Resistant
Strong bases	Resistant
Solvents	Resists alcohols, aliphatic hydrocarbons and oils. Soluble or swells in ketones and esters. Swells in aromatics.
Halogens	Attacked by elemental halogens. Resists water solutions.

Sample Specification Schedule 80 Pressure Fittings and Pipe

Schedule 80 (PVC)(CPVC) pressure fittings shall be manufactured by R & G Sloane, shall be made of (PVC 12454-B)(CPVC 23447-B) or better and shall conform to the requirements of (PVC – ASTM D 2464, threaded type and ASTM D 2467, solvent cemented type)(CPVC – ASTM F 441; ASTM F 437, threaded type; and ASTM F 439, solvent cement type) except that the socket type fittings and the socket wall thickness over the threads of threaded type fittings shall be at least 100% of the wall of the equivalent size of Schedule 80 pipe and except that the body wall thickness shall be 125% of the wall of the equivalent Schedule 80 pipe. All internal tapped threads shall be machined to the requirements of ANSI/ASME B1.20.1.

Solvent Welded Pressure Rating vs. Service Temperature — CPVC and PVC

Nom. Size	D Outside Dia.	t Wall	DR = D/t	P 73°F PVC f=1 S=2000	P 73°F CPVC f=1 S=2000	P 80°F PVC f=0.75 S=1500	P 100°F PVC f=0.65 S=1300	P 110°F PVC f=0.50 S=1000	P 120°F PVC f=0.44 S=880	P 120°F CPVC f=0.65 S=1300	P 130°F PVC f=0.30 S=600	P 130°F CPVC f=0.47 S=1133	P 140°F PVC f=0.22 S=440	P 140°F CPVC f=0.34 S=1000	P 150°F CPVC f=0.40 S=800	P 160°F CPVC f=0.23 S=500	P 200°F CPVC f=0.20 S=400	P 210°F CPVC f=0.16 S=320
¼	.840	.147	5.714	848	848	636	528	424	339	662	255	484	187	424	339	212	170	136
⅜	1.050	.154	6.818	688	688	516	426	344	275	447	206	382	151	344	275	172	138	110
½	1.315	.179	7.346	630	630	473	390	315	252	410	189	358	139	315	252	158	126	101
¾	1.660	.191	8.691	520	520	390	322	260	208	338	156	296	114	260	208	130	104	83
1	1.900	.200	9.500	471	471	353	292	235	188	306	141	268	104	236	188	118	94	75
2	2.375	.218	10.894	404	404	303	251	202	162	263	121	230	89	202	162	101	81	65
2½	2.875	.276	10.417	425	425	319	263	212	170	276	127	242	93	212	170	106	85	68
3	3.500	.300	11.667	378	378	281	233	188	150	244	113	214	83	188	150	94	75	60
4	4.500	.337	13.353	324	324	243	201	162	130	210	97	185	71	162	130	81	65	52
6	6.625	.432	15.336	279	279	209	173	140	112	181	84	159	61	140	112	70	56	45
8	8.625	.500	17.250	248	248	185	153	123	98	160	74	140	54	123	98	62	49	39

$P = \frac{2St}{D-t} = \frac{2S}{DR-1} = P_{73°F} \cdot f$

P = Pressure rating of pipe at service temperatures (psi)
S = Hydrostatic design stress (psi)
D = Outside diameter of pipe (inches)
t = Pipe wall thickness (inches)
f = Derating factor for service temperature
DR = Dimension ratio (D/t)
$P_{73°F}$ = Pressure rating at 73°F

1.) Figures for pressure rating at 73°F are rounded off from actual calculated values. Pressure ratings for other temperatures are calculated from 73°F values.
2.) Pressure rating values are for PVC(12454-B) and CPVC(23447-B) pipe and for most sizes are calculated from the experimentally determined long term strength of PVC1 and CPVC extrusion compounds. Because molding compounds may differ in long term strength and elevated temperature properties from pipe compounds, piping systems consisting of extruded pipe and molded fittings may have lower pressure ratings than those shown here, particularly at the higher temperatures. Caution should be exercised when designing PVC systems operating above 100°F and CPVC systems operating above 180°F.
3.) The pressure ratings given are for solvent cemented systems. When adding valves, flanges or other components, the system must be derated to the rating of the lowest component. (Pressure ratings: molded or cut threads are rated at 50% of solvent cemented systems. Flanges are 150 psi; for valves, see manufacturer's recommendation.)

SCHEDULE 80 PVC & CPVC

DIMENSIONAL AND WEIGHT DATA
(For CPVC weights multiply by 1.1)

COUPLING

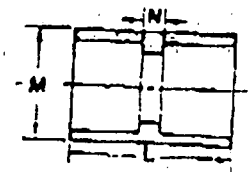


FIG 829
S x S

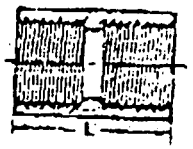


FIG. 830
T x T

SIZE	SIZE CODE	L SLIP	L THREAD	M	N	WEIGHT — LBS. FIG. 829	WEIGHT — LBS. FIG. 830
1/4	002	1 3/8	1 15/16	27/32	1/8	0.022	0.023
3/8	003	1 5/8	1 15/32	1.0	1/8	0.033	0.035
1/2	005	1 27/32	1 18/32	1 7/32	3/32	0.047	0.065
3/4	007	2 1/8	1 23/32	1 1/2	3/32	0.096	0.086
1	010	2 7/8	2 1/16	1 13/16	3/32	0.150	0.145
1 1/4	012	2 18/32	2 7/32	2 3/16	3/32	0.227	0.218
1 1/2	015	2 7/8	2 1/2	2 1/2	5/16	0.303	0.261
2	020	3 1/8	3.0	3.0	5/16	0.423	0.342
2 1/2	025	3 13/16	3 11/32	3 3/4	1/4	0.641	0.675
3	030	4 7/32	3 15/32	4 3/16	1/4	0.829	0.958
4	040	5 5/16	3 21/32	4 23/32	1/8	1.416	1.468
6	060	6 1/4	—	7 21/32	1/4	3.412	—
8	080	8 3/8	—	9 3/4	1/4	6.640	—

REDUCING COUPLING

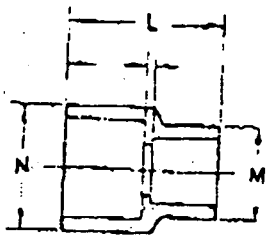


FIG. 829-1
S x S

SIZE	SIZE CODE	M	N	L	WEIGHT LBS.
3/4 x 1/2	101	1 5/32	1 3/8	1 31/32	0.064
1 x 3/4	131	1 13/32	1 23/32	2 11/32	0.101
1 1/4 x 1	168	1 3/8	2 3/32	2 11/16	0.176
1 1/2 x 1 1/4	212	2 3/32	2 3/8	2 3/4	0.211
2 x 1 1/2	251	2 11/32	2 13/16	2 15/16	0.304
4 x 2	420	2 7/8	5 9/32	3 7/8	1.151

Selection Data – Hi-Strength Schedule 80 PVC & CPVC Fittings

Physical & Thermal Properties

	PVC	CPVC
Specific Gravity	1.4	1.54
Izod Impact Strength (ft. lbs/inch of notch)	0.8	1.7
Tensile Modulus, psi	4.2×10^5	4.23×10^5
Ultimate Tensile Strength, psi	7200	8000
Working Stress @ 73°F, psi	2000	2000
Working Stress at Upper Temperature Limit	440	320
Upper Temperature Limit	140°F	210°F
Hazen Williams "C" Factor	150	150
Coefficient of Linear Expansion 10^{-5}in/in/°F	3.0	3.8
Thermal Conductivity BTU/hr/ft²/in/°F	1.10	.96

Flammability — Burns only when in contact with ignition source.

Compressed Air or Gases

R & G Sloane strongly recommends against testing assembled PVC or CPVC piping systems with compressed air or other compressed gases and against using PVC or CPVC systems for distribution of compressed air or gases.

Chemical Resistance of PVC and CPVC

Weak acids	Resistant
Strong acids	Resistant in most situations
Weak bases	Resistant
Strong bases	Resistant
Solvents	Resists alcohols, aliphatic hydrocarbons and oils. Soluble or swells in ketones and esters. Swells in aromatics.
Halogens	Attacked by elemental halogens. Resists water solutions.

Sample Specification Schedule 80 Pressure Fittings and Pipe

Schedule 80 (PVC)(CPVC) pressure fittings shall be manufactured by R & G Sloane, shall be made of (PVC 12454-B)(CPVC 23447-B) or better and shall conform to the requirements of (PVC – ASTM D 2464, threaded type and ASTM D 2467, solvent cemented type)(CPVC – ASTM F 441; ASTM F 437, threaded type; and ASTM F 439, solvent cement type) except that the socket type fittings and the socket wall thickness over the threads of threaded type fittings shall be at least 100% of the wall of the equivalent size of Schedule 80 pipe and except that the body wall thickness shall be 125% of the wall of the equivalent Schedule 80 pipe. All internal tapped threads shall be machined to the requirements of ANSI/ASME B1.20.1.

Solvent Welded Pressure Rating vs. Service Temperature — CPVC and PVC

Nom. Size	D Outside Dia.	t Wall	DR = D/t	P 73°F PVC f=1 S=2000	P 73°F CPVC f=1 S=2000	P 80°F PVC f=0.78 S=1500	P 100°F PVC f=0.62 S=1240	P 110°F PVC f=0.50 S=1000	P 120°F PVC f=0.46 S=920	P 120°F CPVC f=0.65 S=1300	P 130°F PVC f=0.30 S=600	P 130°F CPVC f=0.57 S=1135	P 140°F PVC f=0.22 S=440	P 140°F CPVC f=0.50 S=1000	P 160°F CPVC f=0.46 S=920	P 180°F CPVC f=0.28 S=560	P 200°F CPVC f=0.20 S=400	P 210°F CPVC f=0.18 S=360
¼	.840	.147	5.714	848	848	636	528	424	339	862	255	484	187	424	338	212	170	136
½	1.050	.154	6.818	688	688	516	426	344	275	447	206	392	151	344	275	172	138	110
1	1.315	.179	7.346	630	630	473	390	315	252	410	189	358	139	315	252	158	126	101
1¼	1.660	.191	8.691	520	520	390	322	260	208	336	156	296	114	260	208	130	104	83
1½	1.900	.200	9.500	471	471	353	292	235	188	308	141	268	104	235	188	118	94	75
2	2.375	.218	10.894	404	404	303	251	202	162	263	121	230	89	202	162	101	81	65
2½	2.875	.276	10.417	425	425	319	263	212	170	276	127	242	93	212	170	106	85	68
3	3.500	.300	11.667	378	378	281	233	188	150	244	113	214	83	188	150	94	75	60
4	4.500	.337	13.353	324	324	243	201	162	130	210	97	185	71	162	130	81	65	52
6	6.625	.432	15.336	279	279	209	173	140	112	181	84	159	61	140	112	70	56	45
8	8.625	.500	17.250	248	248	185	153	123	98	160	74	140	54	123	98	62	49	39

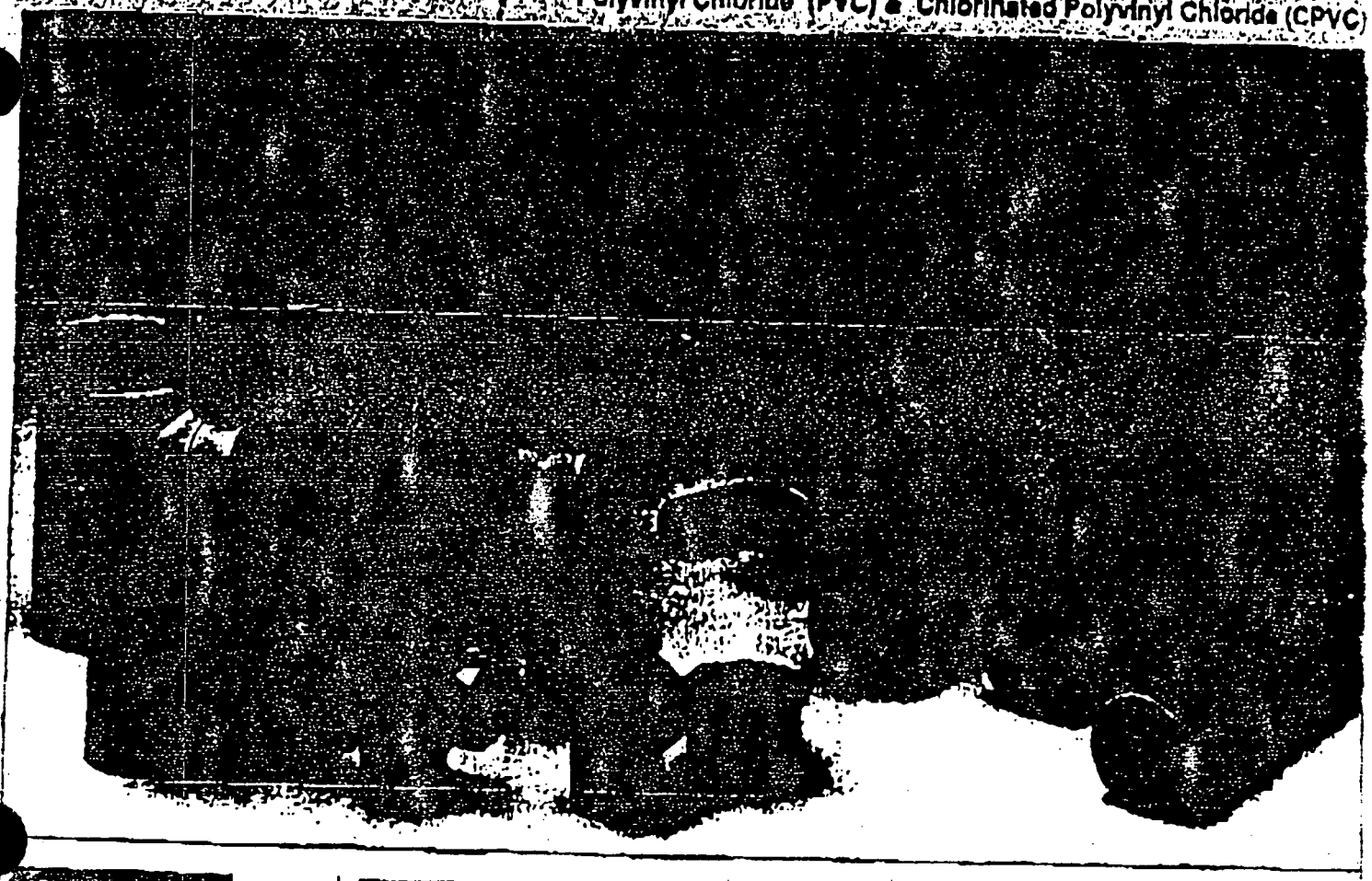
$P = \frac{2St}{D-t} = \frac{2S}{DR-1} = P_{73°F} \times f$

P = Pressure rating of pipe at service temperatures (psi)
S = Hydrostatic design stress (psi)
D = Outside diameter of pipe (inches)
t = Pipe wall thickness (inches)
f = Derating factor for service temperature
DR = Dimension ratio (D/t)
$P_{73°F}$ = Pressure rating at 73°F

1.) Figures for pressure rating at 73°F are rounded off from actual calculated values. Pressure ratings for other temperatures are calculated from 73°F values.
2.) Pressure rating values are for PVC(12454-B) and CPVC(23447-B) pipe and for most sizes are calculated from the experimentally determined long term strength of PVC1 and CPVC extrusion compounds. Because molding compounds may differ in long term strength and elevated temperature properties from pipe compounds, piping systems consisting of extruded pipe and molded fittings may have lower pressure ratings than those shown here, particularly at the higher temperatures. Caution should be exercised when designing PVC systems operating above 100°F and CPVC systems operating above 180°F.
3.) The pressure ratings given are for solvent cemented systems. When adding valves, flanges or other components, the system must be derated to the rating of the lowest component. (Pressure ratings, molded or cut threads are rated at 50% of solvent cemented systems. Flanges are 150 psi; for valves, see manufacturer's recommendation.)

Hi-Strength Schedule 80™ Fittings and Pipe

Polyvinyl Chloride (PVC) & Chlorinated Polyvinyl Chloride (CPVC)

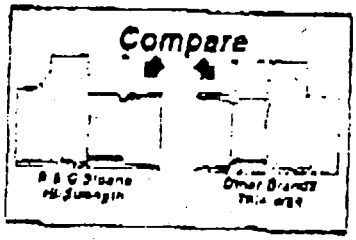


Benefits of GSR Hi-Strength Schedule 80 Fittings and Pipe

- Available in PVC and CPVC.
- PVC handles temperatures to 140°F.
- CPVC handles temperatures to 210°F.
- Stronger performance.
- High chemical and corrosion resistance.
- Lower installed cost.
- Maintenance free internal and external surfaces.

Stronger Fittings

The GSR Hi-Strength Schedule 80 fitting design puts extra material at the points of greatest stress concentration. Quick burst and long term tests show most tee and elbow failures occur in the crotch area or side walls. Conversely, little or no stress occurs in the socket walls since these areas are reinforced by the pipe inside them. Thus, by thickening the crotch



and side walls (as shown in the diagram) the ability of the fitting to withstand pressure is substantially improved.

In fact, quick burst tests reveal GSR Hi-Strength Schedule 80 fittings are at least 10% stronger than conventionally designed tees, 6.8% stronger than conventionally designed ells and 5.7% stronger than conventionally designed couplings.

Outstanding Chemical Resistance

PVC and CPVC thermoplastics are highly resistant to acids, alkalis, alcohols and many other corrosive materials. Both materials are ideal for process piping installation and most service piping applications.

CPVC Offers Higher Temperature Rating

Engineers and contractors can now specify GSR Schedule 80 fittings and pipe made from CPVC high temperature thermoplastic. CPVC is capable of handling water supplies, hot water and process piping applications at any temperature up to 210°F.

Higher Flow Rating

Smooth interior walls result in lower pressure loss and higher volume. (Hazen Williams C Factor = 150)

Maintenance Free Service

CPVC and PVC thermoplastics will not rust, scale, pit or corrode, nor are they subject to electrolysis. You are assured many years of leak-free maintenance-free service. For buried applications, CPVC and PVC are not affected by soil conditions. Painting is not required for indoor non-exposed installations. For outdoor, sunlight exposed installations, painting with two coats of white colored water base latex paint provides added protection.

Lower Installed Cost

Both PVC and CPVC have installed costs which are substantially lower than with steel, alloys or lined steel and are competitive with carbon steel. Solvent cemented connections contribute to lower installed costs. The much lighter weight (about one-sixth as much as steel) speeds and simplifies handling during installation.

Versatility and Dependability

PVC and CPVC fittings and pipe have been found suitable for more than 90% of the corrosive and non-corrosive applications within the chemical process industry.

R&G

INSTALLATION INFORMATION

RECOMMENDATIONS FOR INSTALLERS AND USERS:
Plastic piping systems should be **ENGINEERED, INSTALLED,** and **OPERATED** in accordance with **ESTABLISHED DESIGN AND ENGINEERING STANDARDS AND PROCEDURES** for plastic piping systems. Suitability for the intended service application should be determined prior to installation.

SOLVENT WELD CONNECTIONS — Use a quality grade of primer and solvent cement formulated for the type of connection, with the **CORRECT SIZE APPLICATOR.** Read and follow all of the solvent cement **MANUFACTURER'S APPLICATION INSTRUCTIONS.**

THREADED CONNECTIONS — Spears Manufacturing Company recommends the use of a quality grade Teflon tape. Choice of either Teflon tape, paste, or other pipe joint compound is at the discretion of the installer. The manufacturer's literature for these products should be reviewed for proper selection and application procedures. **WARNING: SOME PIPE JOINT COMPOUNDS OR TEFLON PASTES MAY CONTAIN SUBSTANCES THAT COULD CAUSE STRESS CRACKING TO PLASTIC.**

1 to 2 turns beyond **FINGER TIGHT** is generally all that is required to make a sound plastic threaded connection. Unnecessary **OVERTIGHTENING** will cause **DAMAGE TO BOTH PIPE AND FITTING.**

FLANGE MAKE-UP — Once a flange is joined to pipe, the method for joining two flanges is as follows:

A. Piping runs joined to the flanges must be installed in a straight line position to the flange to avoid stress at the flange due to misalignment. Piping must also be secured to prevent lateral movement which can create stress and damage the flange.

B. Align the bolt holes of the mating flanges by rotating the ring into position.

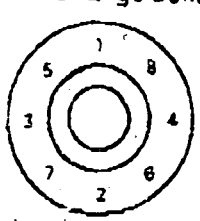
C. Insert all bolts.

D. Make sure the faces of the mating surfaces are not separated by excessive distance prior to bolting down the flanges.

E Tighten the bolts on the plastic flanges by pulling down the nuts diametrically opposite each other using a torque wrench. Tighten bolts according to sequence shown in diagram. Completed tightening should be accomplished in stages and the final torque values followed according to the size of the flange. See torque chart for recommended torque. Uniform pressure across the flange will eliminate leaky gaskets.

CAUTION: UNNECESSARY OVERTORQUING WILL DAMAGE THE FLANGE

The following tightening sequence is suggested for the flange bolts.



FLANGE SIZE	RECOMMENDED TORQUE
½-1¼"	10-15 Ft. Lbs.
2-4"	20-30 Ft. Lbs.
6-8"	33-50 Ft. Lbs.
10"	53-75 Ft. Lbs.
12"	80-110 Ft. Lbs.

Bolts and Gaskets are not furnished.

FLANGE SIZE	BOLT HOLES	BOLT DIAMETER	BOLT LENGTH (MINIMUM)
½	4	½	2½
¾	4	½	2½
1	4	½	2½
1¼	4	½	2½
1½	4	½	3.0
2	4	⅝	3.0
2½	4	⅝	3½
3	4	⅝	3½
4	8	⅝	3½
5	8	¾	4.0
6	8	¾	4½
8	8	¾	5.0
10	12	⅞	5½
12	12	⅞	5½

Based on use of two flat washers and ⅛ Thick Gasket

NORMALLY A NEOPRENE FULL FACE GASKET, ⅛" THICK, IS RECOMMENDED. MORE RESISTANT GASKET MATERIALS SHOULD BE USED ON SYSTEMS HANDLING HIGHLY AGGRESSIVE CHEMICALS.

IMPORTANT

WATER HAMMER — Spears Manufacturing Company, Inc., recommends that all PVC and CPVC plastic piping systems be designed and constructed to **AVOID EXCESSIVE WATER HAMMER.** Water hammer can cause damage, and failure to pipe, valves, and fittings within the piping system.

Spears Manufacturing Company **DOES NOT RECOMMEND** the use of thermoplastic piping products for systems to transport or store compressed air or gases, or the testing of thermoplastic piping systems with compressed air or gases in above and below ground locations. The use of our product in exposed, compressed air or gas systems automatically voids our warranty for such products and its use against our recommendation is entirely the responsibility and liability of the installer.

Spears Manufacturing Company will not accept responsibility for damage or impairment of its products or other consequential or incidental damages caused by

CORPS OF ENGINEERS EN[redacted]EERING REVIEW COMMENTS

Section	Item Number	Corps Comments	OHM's Response	Comment Action
Comments by: Katie Watson and Mike Goreham				
	1	Title could be a little more specific, such as Sewer Line Repair at Former Dry Cleaning Facility. (MG and KW)	The title has been changed.	A
Page 1-1, para. 1.1	2	Site history could provide details about why the line replacement was being made. Explain the lost sandbag and efforts to clean the pipe using a -et truck. (MG) (Fort Riley has provided this information as an enclosure.	The comment has been noted. The line was being replaced, because it was blocked. Fort Riley has not provided information relative to a lost sandbag or -et truck.	A
Page 1-1, para 1-1	3	Indicate the potential contaminant of concern in soil. (MG)	The text has been changed.	A
Page 1-1	4	It would be beneficial to include in the site history that Fort Riley is on the NPL list.	The text has been changed.	A
Section 1.1., 3rd line	5	The sewer line is currently being used, not formerly used. Please revise.	The text has been revised.	A
Page 2-2, para 2.4	6	Describe what was found when pipe was excavated (i.e. there was no apparent connection between the pipe and the manhole and that the inlet at the bottom of the manhole was not a drop inlet for the pipe being replaced. (MG) This discussion would be appropriate in 3.3.2.	The text has been changed.	A
Page 2-2, para 2.4	7	Describe the specific observation of a large void under the concrete. This is documented in Appendix D, Daily Report for 5/1/94. (MG)	The text has been changed.	A

tion	Item Number	Corps Comments	OHM's Response	Comment Action
Page 2-2, para. 2.4	8	All construction debris was taken to the C/D landfill, not the Custer Hill Landfill. Revise throughout document. (MG)	The text has been changed.	A
Page 2-3, para 2.6	9	Discuss the unexpected settlement of the fill after a rainfall. Also, indicate what caused the void and how it was dealt with. (MG)	The text has been changed.	A
DWG 15747A20	10	Provide a site map that includes the following: a. building 183, b. all of the storm and sanitary sewer lines and the area showing at least one manhole in each direction (or in the event of the storm sewer, where it daylights), c. label manholes with manhole number, d. show flow direction of storm and sanitary sewer lines, e. the storm sewer does not run to the sanitary sewer manhole, as the drawing indicates, f. indicate where the 2' x 2' grate flows to. This information is pertinent to understanding what was happening in this area. (MG)	a. DWG 15747A20 has been modified. b. Figure 2.3, provided by Fort Riley, has been added. c. Labels have been added. d. DWG 15747A20 has been modified. e. DWG 15747A20 has been modified. f. DWG 15747A20 has been modified.	A
DWG 15747A1	11	Revise so that it is easier to see how where the green storm pipe was placed in relation to the sanitary sewer. (MG)	DWG 15747A1 has been revised.	A
Section 2.3	12	Diversion of the water is not mentioned as part of the site prep/teardown. Please include. Also include the problems encountered during diversion (i.e. water backing up in MH #363A)	Section 2.4 has been revised.	A

Section	Item Number	Corps Comments	OHM's Response	Comment Action
Section 2.3, para. 3	13	Please include purpose of the air monitoring/ meteorological station.	To provide support to the U.S. Army Corps of Engineers Kansas City District in their site investigation and subsequent preparation of a baseline risk, OHM used the air monitoring/ meteorological station. The text has been revised in Section 2.7.	A
Section 2.4, para. 1	14	Indicate if there were any ancillary soils disposed with the construction debris.	The text has been revised.	A
Section 2.4, para. 3	15	Include what the "action limits that had been previously established for this site" were.	The text has been revised.	A
Section 2.4, para. 4	16	In addition to the damaged 18-inch storm sewer line (not sanitary storm sewer), please discuss the 8-inch clay pipe that was damaged, and upon consultation with DEH personnel, OHM was told that the line was abandoned, therefore it was not fixed. The line was indeed active and DEH replaced the line in June/July 1994, by connecting it the 18" green PVC placed by OHM. Full discussion of this information belongs in Section 3.3.2, but mention it here, also.	The text has been revised.	A
Section 2.6	17	Indicate that excavated soils were placed into the hole as backfill. Minimal compaction was performed, and it settled into voids under the concrete after a rain event, therefore gravel had to be brought in.	The text has been revised.	A

S[redacted]	Item Number	Corps Comments [redacted]	OHM's Response	[redacted]nment Action
Section 2.7 and throughout	18	The material containerized in the roll-offs was disposed of in the Fort Riley's active construction debris landfill. The small amount of hazardous waste generated from cleaning out manhole 363B was disposed through Fort Riley's Defense Reutilization and Marketing Office (DRMO). Please revise all references to T&D of hazardous waste.	The text has been revised.	A
Figure 2.1	19	Differentiate between storm and sanitary sewer lines. - The storm line does not enter the manhole. - Indicate the storm line running E-W. - Include legend. - Indicate how much of the storm line was replaced.	The figure has been revised.	A
Figure 2.2	20	Needs a lot of work.	The comment has been noted.	A
Section 3.1.1, para. 1	21	Indicate date of work plans.	The text has been revised.	A
Section 3.3.2	22	Indicate if any ancillary soils were generated from the asphalt removal.	The text has been revised.	A
Section 3.3.2, para. 4	23	Include analysis from roll-offs.	Refer to appendices and table. The text has been revised.	A
Section 3.3.2, para. 5	24	The manhole materials were placed in a 10 gallon drum which was placed in a 55 gallon drum after it was damaged by another contractor. Subsequently, it was disposed of through DRMO.	The text has been revised.	A

S[redacted]n	Item Number	Corps Comments [redacted]	OHM's Response	[redacted]mment Action
Section 3.3.2, para. 6 Page 3-5, para. 3.3.2	25	Indicate who "mutually assumed" the soil classification. Also, Fort Riley provided soil classification data from the area (See Daily Quality Control Reports dated 4/25/94). Also, shoring was 1.5 inches thick. Discuss how soils were compacted. Describe and explain the sudden settlement and void in the filled trench. Also, discuss the other storm line which was damaged and thought to be abandoned, plus the storm water problems which occurred after this work. DEH has subsequently replaced the damaged line by connecting it to the 18 inch green PVC which OHM replaced. (MG)	The text has been revised.	A
Page 3-5, para. 3.3.2	26	The last sentence states the asphalt removed was replaced. Earlier it was stated it was hauled to the C/D landfill. Please indicate that Custer Avenue was patched with new asphalt. (MG)	The text has been revised.	A
Page 3-5, Inspection, para. 1	27	Indicate criteria for "successfully passing" the USACE inspection. Also, include why the backfill received minimal compaction (to aid our soil vapor extraction efforts). Gravel was also used as backfill.	The text has been revised.	A
Section 4.0	28	Discussion of the contractor's management of the sub-contractors and equipment/material procurement does not seem necessary or appropriate for inclusion in this report.	The section has been deleted.	A

Section	Item Number	Corps Comments	OHM's Response	Comment Action
Page 4-1, last para.	29	Please include copies of the mentioned corrective action plans, or further clarify the purpose of them/what situations warranted them.	The section has been deleted.	A
Section 6.0	30	There are no conclusions or recommendations concerning the large void discovered, lack of connection between the pipe and manhole, settlement problem, etc. The association of this discussion with the site is questionable. Please clarify and add discussion of conclusions on why the line was in such bad shape and recommendation on maintenance of the line and how the life of the line may be augmented.	The text has been revised.	A
Appendix A, page 1-1, para. 1.2	31	Sewer line did not carry solvents. This was a sanitary sewer line that carried wash water from the laundry and dry cleaning plant. Wash water was contaminated with solvents. Please revise. (MG)	The comment has been noted.	A
Appendix A, page 1-1, para. 1.3	32	The upper manhole (MH #365) was in Custer Ave., the lower manhole (MH #363) was in building 180 parking lot. (MG)	The comment has been noted.	A
Appendix A, Page 1-2	33	Please include a site map that shows building 180/181 and 183. (MG)	The figures in the body of the text have been revised.	A
Appendix G	34	Provide a caption for each photograph. Explain what photos 13-15 show. (MG)	Photos have been labeled.	A
Comments by: Joe Shields				
Cover	1	This project was titled: Rapid Response Replacement of Sanitary Sewer Line, Building 180-183. Please put this title on the cover page. Also include the location: Fort Riley, Kansas.	The title have been revised.	A

Section	Item Number	Corps Comments	OHM's Response	Comment Action
Section 2.0	2	Refer to the Final SOW, not to the Draft SOW.	The text has been revised.	A
Section 2.2	3	List personnel and equipment used, and their respective mobe/demobe locations. For personnel, also list job titles.	The text has been revised.	A
Figure 2.2	4	I am not familiar with the term "Altitude Flow Line." Please remove and give the invest elevation. Change to Inv. Elv.	Figure 2.2 has been revised.	A
Figure 2.2	5	The figure shows the elevation drop in the lower manhole being accomplished through a vertical section of PVC pipe located in the interior of the manhole. This method is not industry standard practice. Is this figure accurate? If so, why was the drop located in the interior of the manhole. If not, please revise the figure. Attached is a figure showing a typical drop manhole. NOTE: Replaced as in the field.	The figure is accurate, and the replacement sewer line was installed in the same manner as the old sewer line.	A
Section 3.2.2, page 3-4	6	Define "LWD."	The text has been rewritten.	A
Section 3.3.2, page 3-5	7	Your assumption that a leakage test was not required because PVC pipe was used instead of vitrified clay pipe is wrong.	The text has been rewritten.	A
General	8	Include results of compaction tests, graduation and proctor for select granular fill and state how many compaction tests were accomplished, where, and the method used.	The text has been rewritten. Compaction tests were not completed per the direction of the USACE OSR because of the pending SVE remediation project for that area.	A

Sec	Item Number	Corps Comments	Response	Action
General	9	Document use of marking tape and color, assuming this was done. It was required by SOW.	The backfill operation was done in extreme haste due to the IMMINENT approach of a severe thunderstorm. In the urgency of the moment, all personnel on site simply forgot to use the marking tape to mark the various utilities.	A
General	10	Include a section listing modifications and describe the requirements of each mod. Also, provide a discussion on what was done in the field to meet requirements of the mod.	A section has been added addressing the modifications.	A
Appendix H	11	I don't thing "Janet Wade Letter" is an appropriate title for an appendix. Entitle this appendix, "Correspondence" and include other correspondence pertinent to the project.	The title of the appendix has been changed.	A
Appendix G	12	Please include a narrative with the photo documentation stating what each photo is showing and at what stage of the project was the photo taken.	Photos have been labeled.	A
General	13	The SOW, Section 3.9 required the contractor to submit 3 Category III submittals, none of which were ever sent. Include each of these submittals in the Final Report.	The submittals have been included.	A
Comments by: Jim Woolcott				
Section 2.4, page 2-3, para. 1	1	Old sewer line excavation -- My name is correctly spelled "Jim Woolcott," not "Jeff Wolcott."	The text has been revised.	A
Section 3.3.2, page 3-4	2	Shoring Operations - The dimensions of the wood reinforcement sheets is given as 4 ft. x 8 ft. x 1.5 ft. Shouldn't this be 4 x 8 x 1.5 inches?	The text has been revised.	A

[redacted]n	Item Number	Corps Comments	[redacted]	OHM's Response	[redacted]mment Action
General	3	I thought this report was well prepared and written.		The comment has been noted and appreciated.	A