RCRA Facility Assessment (RFA)
Draft Final RFA Report

Texaco Research Center Beacon

EPA I.D. No. NYD091894899

September 1992

I. Introduction

The RCRA Facility Assessment (RFA) is a process for identifying and gathering information on releases of hazardous waste or hazardous constituents at RCRA facilities. The RFA evaluates solid waste management units (SWMUs) and other areas of concern (AOCs) for releases to all media and makes preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.

Information is gathered and evaluated to determine whether there are or have been releases from SWMUs or other areas of concern that warrant further investigation or other action. The process generally consists of the preliminary review, the visual site inspection, and the sampling visit.

II. Preliminary Review

The Preliminary Review (PR) is conducted to gather and evaluate existing information on the facility in order to identify and characterize potential releases to focus the activities to be conducted during the visual site inspection and sampling visit. The PR for this facility was written on December 1985, with an addendum written on September 1992 which brings the material in the original PR up to date. The PR and addendum are attached to this report (Attachment A). The PR describes the unit conditions, release description, target populations or environments and recommendations for further action for each SWMU. The addendum describes the current status and future plans for the SWMUs.

III. Visual Site Inspection

The Visual Site Inspection (VSI) is conducted to inspect the facility for evidence of releases and to identify additional areas of concern.

IV. Sampling Visit

A Sampling Visit for most of the SWMU's was not conducted in the traditional sense, since most of the units were undergoing Corrective Action under the CERCLA program when the Preliminary Review was being written. The details of the work and data from the investigation are described in the document "Report of Remedial Action at Inactive Disposal Site" dated August 1986 and the report titled "Report for the Certification of the Closure of the Hazardous Waste Sludge Lagoon" dated July 1986. Relevant excerpts from these titles are included in Attachment B of this document. The Sludge Lagoon was closed under the RCRA program by an approved workplan.

Another unit mentioned in the PR is the Container Storage Building (#83). When footings for this building were being installed, it was noted that a persistent oily sheen was visible floating on the groundwater seeping into the excavation for the footing. Based on this incident, it was decided that sampling was needed for this area. A workplan for RFI sampling was approved on August 16, 1992. Since there was a known release (the oily material floating on the groundwater), this investigation is more of a RFI than a RFA.

There is also an ongoing investigation in the area where the land disposal units used to be. Two plumes of contaminated groundwater are traveling north and seem to be converging at the Texaco baseball field near Fishkill Creek. A RFI investigation is being performed to determined whether the combined plumes are headed for the Creek or for a pump and treat remediation system (installed for another problem) at an adjacent Tank Farm.

This work is being conducted as part of a 373 Post-Closure Permit issued to Texaco on March 1991.

V. Conclusions and Recommendations

Of the ten (10) SWMUs listed in the PR only Building #83 and a plume of contaminated groundwater remain under investigation.

Preliminary Assessment
Texaco Research Center Beacon
NYD 091894899
Glenham, New York

Texaco Research Center Beacon is located on 140 acres of land in Glenham, NY. The are nine SWMU's at the site. There are six SWMU's which are currently having their hazardous waste removed through a CERCLA Order-on-Consent and this effort is representative of immediate corrective action. Of the remaining three RCRA units, two are being permitted (tank and container storage) and the third is currently going through closure under RCRA. The chart below reflects the recommendations for the next phase of activity at each unit based upon the results of this preliminary assessment.

Unit	Regulated	No Further Action	S.I.	R.I.	Immediate Corrective Action
CDS	N	-	-	Y	Underway
DP	N	-	-	Y	"
OSL	N	-	-	Y	"
NSL	N	-	-	Y	"
CBS-1	N	-	-	Y	"
CBS-2	N	-	-	Y	"
CBS-3	N	-	-	Y	"
Tanks	N	-	-	-	-
Containers	N	-	-	-	-
Waste Water Treatment Plant	N	Y	-	-	-

Review of the information presented and the amount of data already accumulated concerning this site, sufficient evidence of release already exists and a remedial investigation is the next step. Specific Recommendations for this investigation include, but are not limited to: further soil samples near the closed SWMU areas to ensure all contaminated soils were extracted; a review of the CERCLA groundwater monitoring plan to find out if further action is required under 3004(u); a sampling program at the intermittent stream and adjoining pond to test for any of the pollutants from the disposal site; and a complete assessment of the plume from the RCRA lagoon. Studies of the geology and hydrogeology of the area were completed under CERCLA, however, further information may be required depending upon the adequacy of these reports. A list of reports and investigations concerning TRCB upon which this preliminary assessment is based are given in Attachment C.

FACILITY BACKGROUND

Texaco Research Center (formerly known as "Beacon Research Laboratories")is a Texaco, Inc. owned and operated facility located on approximately 140 acres of land in Glenham, New York. It is an on-shore, non-production, non-transportation laboratory complex engaged in research, development and technical service related to petroleum products and energy. Petroleum and coal products, solvents and various chemical compounds are used at this plant in connection with the research functions. A site map is provided in Attachment B.

The main research complex of TRCB is located on property north of the Fishkill Creek. From data obtained in the Part B application for this site hazardous waste storage/treatment units include; containerized waste storage, a tank for accumulation and storage of solvents, a waste laboratory chemical storage building and a wastewater treatment plant. The integrity of the units, including operating practices and emergency containment and clean-up procedures, have been shown to be sufficient. On the basis of the 3004(u) response submitted by TRCB and previous RCRA inspections, there is no evidence of leakage from any tank or container unit to either the groundwater, surface water, or air. Therefore, it is assumed that, in fact, no releases have occurred or that possible releases were contained and immediately cleaned up. The wastewater treatment plant treats laboratory waste streams and is monitored and enforced by a State SPDES permit. This SWMU is considered as having no significant releases based upon an examination of the reports in the SPDES files. In addition, there is no evidence of the existence of any additional SWMU's in this area of the TRCB facility. Therefore, it seems appropriate that the main site be eliminated from further study on the basis that they clearly have not released hazardous wastes or hazardous constituents into the environment.

The inactive disposal portion of TRCB's property is located within a 90-acre parcel situated south of the main TRCB facility and Fishkill Creek. The north property boundary of the site is located approximately 400 ft. south of the Fishkill Creek and is surrounded by lightly developed residential areas. The site exhibits a significant amount of topographical relief.

Based on uses by TRCB, the site may be separated into three areas. The northeast corner of the site is lightly improved and consists of a recreation area. The second area encompasses the individual disposal areas and is located immediately south of the recreation area. A small intermittent stream crosses through this area which feeds a nearby pond. Use of this pond by the public is undertermined at this time. The remainder of the site consists of generally unimproved woodlands and covers the western half of the 90-acre parcel. The approximate area of the disposal sites encompassess 1.4 acres located within a 16-acre portion of the 90-acre property.

The inactive disposal site includes the following distinct areas: Container Disposal Site, Disposal Pit, Old Sludge Lagoon, New Sludge Lagoon, and Chemical Burial Sites -1, -2, and -3. Of these areas the only unit under RCRA regulation is the New Sludge Lagoon, which is presently being closed. The remaining SWMU's are being remediated under a CERCLA order-on-consent with completion expected by the end of 1985. The CERCLA sites on this property were discovered in 1983 when TRCB was performing a groundwater assessment of a plume

that was found generating from the New Lagoon (a RCRA non-regulated unit). When these disposal sites were discovered, TRCB discontinued further investigation of the existing plume and as of this date, has not recommenced a complete study.

During the CERCLA site investigation, contamination to the groundwater was found in the area of the SWMU's. Groundwater quality data indicated the presence of inorganic and organic constituents in concentrations that exceeded established drinking water limits and groundwater standards. (Groundwater in unconsolidated material and bedrock was affected.)

It was determined at the onset of the CERCLA remediation that corrective measures to directly clean up the groundwater contamination from the SWMU's was not feasible. Investigators, therefore, proposed that an adequate plan would consist of source removal followed by an off-site groundwater monitoring program. The off-site monitoring program would act as an "early warning" system for migration of contaminants by providing four pairs of deep/shallow wells. The reason for the bedrock wells results from essentially two factors. The first being that the overburden and bedrock aquifers under the disposal site are hydraulically connected thus allowing contaminants to migrate through fractures in the bedrock. In addition, the possibility exists for interconnection with the Beacon municipal water supply. Although the source is over a mile away, (east of the disposal site), pumping of Beacon's bedrock well causes drawdown at Texaco wells. It should be noted that this plan has been approved as meeting the requirements of the consent order.

LANDFILLS

Remediation is currently taking place on all of the following units under a CERCLA Consent Order. This remediation includes excavation of each unit 2 feet beyond the perimeter and down to the low seasonal water table or rock. For some units the outer perimeter is difficult, at best, to define. Therefore, some concern exists as to whether or not all contaminated subsoils were removed since no soil core samples were taken from the walls of each area to assure a complete excavation had taken place.

It would appear that there is sufficient evidence to conclude that releases did occur to the groundwater from these sites. Since the sources are being removed, however, there is no danger of subsurface gas migration. Any air releases that may occur would do so during the excavations. TRCB has provided a temporary structure to cover the units during excavation to confine air releases within the structure and filter the air through an activated carbon system to the atmosphere. Surface water contamination has not been investigated as of yet, however because of past practices at the site (i.e. poor site management with respect to cover, daily closure, etc) there is reason to suspect this pathway may be involved.

Although most wastes placed in these sites were unidentified, TRCB has provided records which partially identify the material buried at each of the disposal areas. This information is summarized in Attachment A - Contamination Assessment.

1. Container Disposal Site (CDS)

This area is believed to be the oldest disposal location. Disposal activities at this location may have begun in the 1930's (actual period of operation is unknown). This area is poorly defined and generally considered to contain empty containers. The site was overgrown with vegetation; however, laboratory glassware, drums and debris were visible at the surface. The CDS covers an area of approximately 0.6 acres and is located in a low-lying portion of the site. Disposal at this location apparently occurred through direct dumping of wastes on the ground surface.

2. Disposal Pit (DP)

Operated from the late 1940's to the 1950's, the DP was apparently used for the disposal of liquids. The exact location of this area is poorly defined and no visible evidence.of its existence was present at the surface. Generally it appears that small quantities of varied types of materials were deposited at this location. The exact method of disposal of wastes into this area in unknown.

3. Chemical Burial Sites

Three separate areas were utilized for the disposal of laboratory wastes at various times. The first area designated as Chemical Burial Site No. 1 (CBS-1), was utilized from July 1961 through March 1966. The second area, Chemical Burial Site No. 2 (CBS-2), was utilized between June 1966 and June 1970. The last area was utilized from September 1970 through November 1977 and has been designated as Chemical Burial Site No. 3 (CBS-3).

Similar methods of disposal were followed at each one of the three burial sites. Generally, the procedure entailed the excavation of individual "cells" within each burial site. The cells were excavated with a backhoe and were generally 4 feet by 6 feet and 6 feet deep. Waste chemicals and materials from the TRCB laboratory were placed in the cells. It is believed that small amounts of waste were placed in the cells. There is no evidence that cells were filled more than half full. The wastes were then covered with soil, a new cell was excavated, and the procedure was repeated again.

The number of cells excavated at each site was dependent on the quantity of wastes collected during operation. In some cases, larger disposal cells were excavated. Existing records document some of the types of wastes likely to be present in the pits. However, the contents of most of the pits within the burial sites are designated on the existing records as "unidentified."

SURFACE IMPOUNDMENTS

Remediation of the following units is currently, or will be soon, under way. The Old Sludge Lagoon (OSL) is being remediated under the same consent order as the landfill sites. The New Sludge Lagoon (NSL) is being closed under RCRA Interim Status regulations. In the RCRA closure, TRCB is required to complete a soil bore testing program, it is, therefore, likely that all contaminated soils will be removed. Again, any details concerning the identity of waste materials is in Attachment A - Contamination Assessment. There is no evidence of release to either the air or surface water. Groundwater contamination has been confirmed.

1. Old Sludge Lagoon (OSL)

This area was used for the disposal of sludges from the TRCB wastewater treatment system during the period from 1959 through 1963. Wastes include solids from API separator sludge, as well as sanitary and petroleum wastes. The impoundment was unlined and the extent of this site is fairly well defined by an earthen berm.

2. New Sludge Lagoon(NSL)

Operated from 1963 to June 1981. Much the same as the OSL, this unit received sludges from a laboratory wastewater treatment system and from the TRCB sanitary wastewater treatment plant. Sludge contains high amounts of hydrocarbons as well as small quantities of solvents. Annual quantities of sludge were 75,000 gal through 1979. From 1980 to June 1981 approximately 35,000 gal of sanitary wastewater treatment sludge only was added.

TANKS AND CONTAINERS

The RCRA Part B Permit for this facility is specifically for tank and container storage at the main plant site located north of Fishkill Crek. At present, there is no reason to believe that any SWMU's exist at the main site (see TRCB's Continuing Release Document). During the Part B Review, the integrity of all existing tank and container units, as well as their corresponding operating characteristics, were found to be sufficient.

1. Containers

The container management consists of a drum staging area, drum pump-off system, drum storage (non-hazardous, hazardous, and unidentified wastes awaiting testing), and supporting drainage and containmentsystems. Containerized waste containing hazardous waste classifications F001, F002, F003, F005, are segregated and stored in drums before being transferred to tank storage. From tank storage the waste is transported for off-site reuse, recovery, or disposal. Waste oils (non-hazardous) are also stored in drums and periodically pumped to tank storage.

2. Tanks

A total of four covered waste tanks exfst at the TRCB facility. Two of these (capacity totaling 9,000 gal) are used to store oil/skimmings (part volatiles), sludges and grit, oil spills, and runoff from contained areas. These tanks are periodically emptied and the waste sent to a hazardous waste disposal facility. The third tanks is a 10,000 gal storage tank for waste oil prior to therrecovery of that oil. The fourth tank has a capacity of 6,000 gal and is the only regulated tank unit at the site. This tank contains spent solvents for storage prior to off-site reuse, recovery, or disposal.

OTHER

Other areas at the facility where hazardous waste is stored or handled include two buildings and the wastewater treatment plant located at the main plant site. The first building is the Waste Laboratory Chemicals Bilding(#36). Laboratory chemicals designated for disposal are sent to building 36 for processing and storage. The waste laboratory chemicals may include many of the commercial chemical products listed in 40 CFR 261.33, and many meet any one of the hazardous waste characteristics. For purposes of disposal, the chemicals can be described as belonging to various compatibility groups as used by CECOS International, Inc. Chemicals are segreated by grouping, and wastes disposed of in a separate lab-pack drums at a hazardous waste disposal facility.

The second building is the Container Storage Building (#83). This building is used to shelter the following operations and equipment.

- Storage of drummed wastes including waste oils, hazardous wastes (solvent mixtures), non-hazardous waste, and incompletely identified wastes.
- Storage of carboys containing spent halogenated and non halogenated solvent mixtures.
- Oil transfer station.
- Storage of bulk solvent is Tank 266

Wastewaters from laboratory drains and sinks are treated in a permitted treatment system for removal of solids 1,1,1-trichloroethane (TCA), BOD-5, and grease. An API separate unit together with an air flotation unit was used to separte oil from the wastewater in the form of skimmngs and a heavy sludge. Oil sludge and skimmings also meet the "Ignitability" characteristic, and contain some of the EP toxicity metals. The flotation unit replaced with a new wastewater treatment train that include a flow equalization tank, three-stage rotating disc biological contrator and a secondary clarifier.

TCA is the only hazard constituent present in the wastewater since dichlorobenzene was discontined. An engineering report on the new treatment train reports a 97% removal rate for TCA which flows into the new treatment train at an average concentration of 1 mg/l and 0.135MGD. Although TCA is highly volatile its not expected to create a significant release to the air medium and therefore, does not warrant further investigation.

Attachment A

CONTAMINATION ASSESSMENT

Source Areas

The waste materials disposed at the inactive disposal areas consisted of generally small quantities of chemicals and materials generated as by-products of the research and development activities and the routine operation and maintenance of the facility. TEXACO has provided records which partially identify the materials buried at each of the disposal areas. This information s summarized in the following sections.

1. Chemical Burial Site No. 1

This site was documented as receiving the following:

- Spent sulfuric acid (two 15-gallon carboys)
- Phenols (two 55-gallon drums)
- Plastic exhaust bags
- Old automobile mufflers

These wastes are documented for 4 of the 99 individual disposal cells at this site. The remaining cells are marked "unidentified."

2. Chemical Burial Site No. 2

This site was documented as receiving·

- Vinylidine chloride (one small bottle)
- Perfluors guanidine (two-10-gallon cylinders)
- Tetrafluorohydrazine

These materials are documented as being disposed in 3 of 93 individual cells at this site. Of the remaining 90 cells, one is marked as "danger," one is marked as "explosive," and the remaining 88 are marked as "unidentified."

3. Chemical Burial Site No. 3

This site was documented as receiving:

- Peroxides
- Hydroperoxides
- Hydrazines
- Silica gel
- Attapulgus clay
- Petroleum sulfonates (one drum)
- Molecular sieves
- Cyclohexane
- Paraffins
- Benzene
- Nitric oxide (one large cylinder)

These wastes were documented for 8 of 81 cells at this site. The remaining cells are marked as "unidentified."

4. Disposal Pit

The Disposal Pit was reportedly used for liquids disposal. TEXACO has indicated that the pit may have received the following materials:

- Amines
- Imidazolines
- Diamines
- Amides
- Cyanuric chloride
- Tri-n-propyl borate
- Sodium cyanide solution
- Primene salts
- Alkylated phenols
- Aromatic solvents
- Calcium salts
- Boron-fluoride cpds
- Zinc salts
- Cadmium salts
- Lead salts
- Barium salts
- Phos.-sulfur-chloride cpds
- Amines
- Sodium metal
- Sodium sulfide
- Urea
- Ammonium nitrate
- Phosphates
- Potassium chloride
- Tetraethyl lead cans, empty (rinsed)
- Trichloroethylene
- Ferratone

5. Old Sludge Lagoon and New Sludge Lagoon

These sites were used for disposal of sludges from the TRCB wastewater treatment systems (sanitary and laboratory). These sludges reportedly contain small quantities of solvents used in the lab.

6. Container Disposal Site

This site was apparently used for disposal of containers and laboratory materials prior to the establishment of the aforementioned sites. The character and amounts of materials disposed at this site are unknown.

7. Other Chemicals

In addition to the chemicals known to have been disposed at the various areas, the following chemicals are known to have also been disposed at the site. However, the existing records do not identify in which area they were disposed.

- Spent sulfuric acid
- Raney nickel
- Cobalt carbonyl
- Iron carbonyl
- Sodium metal
- Nickel nitrate
- Chromium nitrate
- Aluminum chloride
- Alumina catalysts
- Barium oxide
- Fullers earth
- Filter cakes
- Nitrobenzenes
- Crude oil residues
- Polymers
- Surfactants
- Oil additives
- Ammonia gas
- Degreaser sludge
- Beryllium oxide
- Potassium-sodium alloy
- Alumina catalysts containing nickel, molybendum, cobalt, vanadium, tungsten or titanium cpds

Subsurface

Interim status groundwater monitoring data from the RCRA lagoon indicate that the impoundment has been leaking hazardous constituents into the glacial till aquifer. Statistically significant increases in specific conductance and TOX parameters triggered an assessment program in 1982. The assessment led to the identification of solvents and related compounds, including 1, 1 dichloroethane, 1,1,1 trichloroethane, chloroethane, and trichloroethylene in downgradient wells. Although TRCB has been monitoring the wells they added for the assessment program up until 1983, no additional wells have been added since that time to keep the assessment current. The last sampling data indicated a plume of contamination with chlorinated hydrocarbons extending from the lagoon to the east approximately 400 feet. These compounds may be toxic and carcinogenic in small (ppb) concentrations. Date also indicate that they migrate readily in groundwater, and can be persistent in anaerobic, subsurface conditions.

The analytical programs conducted as part of the Dunn-Geoscience investigations of the inactive CERCLA units disclosed the presence of organic and inorganic contaminants in the groundwater. The concentrations and types of contaminants that have been detected vary from location to location. However, the analytical data incates that most of the groundwater in the area occupied by the various disposal locations has become contaminated. The highest levels of contamination appear to occur in the vicinity of wells DB-13 and DB-17 (see site map Attachment 8). The contamination consists mostly of chlorinated hydrocarbons and trace metals.

Surface Waters

Surface water is one contamination pathway that has not been fully investigated at this site. Surface waters adjacent to or on the property include the Fishkill Creek and the intermittent stream running through the southeast corner of the inactive disposal area. Outfall from the main plant to the Fishkill Creek is regulated through a SPDES permit. The intermittent stream, however, does cause some concern. Visual observation of the disposal sites indicated that these areas were not managed properly during their operation and the contents of these units were subject to contact with storm water. Due to this and the topography of the area it is highly probable that some hasardous constituents flowed into the stream and caused contamination.

Groundwater in the area of the disposal sites has been shown to be contaminated in both the overburden and bedrock aquifers. This contamination consists of a mainly chlorinated hydrocarbons and trace metals. It is unsure at this time as to whether any of this contamination was drawn up into the stream bed or not. If so, it is likely the contaminants could have travled via the stream to a nearby pond. Activities related to the pond have not been investigated (i.e., public usage, etc.). Since this vector of pollutants has not been looked at in the past, it is essential that some sort of stream and pond sampling plan be developed to identify and quantify any contaminants, their transport mechanisms and toxicity. Constituents to be looked for include all of those listed as having been deposited in the disposal areas along with those contaminants already identified in the groundwater. It is believed that this pathway may provide for a significant risk to biotic life in the stream and pond and possibly the community.

Attachment B

Attachment C

LIST OF INFORMATION SOURCES

REPORTS

"Report Site Investigation Inactive Disposal Site, Texaco, Inc. Glenhan, New York" by O.H. Materials, Co., 16406 US Route 224 East, P.O. Box 551, Findlay, Ohio 45839-0551.

"Remedial Action Plan Inactive Disposal Site, Texaco, Inc. Glenham, New York" by O.H. Materials, Co., 16406 US Route 224 East, P.O. Box 551, Findlay, Ohio 45839-0551

"Part B Permit Application for Hazardous Waste Storage", Texaco Research Center, Beacon, New York. March 1984.

OTHER DOCUMENTS

"Closure Plan for Hazardous Waste Sludge Lagoon", Texaco, Inc., Texaco Research Center, Beacon, New York, September 26, 1984.

"Order on Consent" between Texaco, Inc. and NYSDEC signed by Mr. E. R. Christensen, Manager, TRCB and Mr. Paul Keller, Regional Director, Region 3, NYSDEC, February 8, 1985.

"RCRA 1984 Amendments Section 3004(u) Response" submitted to NYSOEC in April of 1985 for Texaco Research Center Beacon NYD #091894899.

Central Office SPDES files.

Addendum to RFA

Texaco Research Center Beacon

EPA I.D. No. NYD091894899

September 1992

In 1986 the Chemical Disposal Site, Disposal Pit, Old Sludge Lagoon and Chemical Burial Sites 1,2, and 3 were closed under the CERCLA program. The New Sludge Lagoon was closed that same year under the RCRA Program.

Immediately after the closures, higher levels of some solvents, primarily TCA and chlorine were detected in wells downgradient of the remediated units. Since then however, levels have been gradually getting lower and now are only a few times their respective action levels. The plume of the more heavily contaminated groundwater continues to move northward toward Texaco's baseball field.

At this time not enough information on groundwater flow exists for this area to determine whether the plume is headed directly for Fishkill Creek or for a nearby Texaco oil tank farm which is currently remediateing its groundwater for a separate problem. The RFI workplan for the baseball field has been submitted in May 1991 and will be approved soon.

Building #83 (the Container Storage Building) is being investigated under an approved RFI workplan. The workplan was approved on August 16, 1992 and results should be available by the end of 1992.

All work is being conducted under a 373 Post-Closure Permit issued on March 1991.

REPORT OF REMEDIAL ACTION AT AN INACTIVE DISPOSAL SITE TEXACO, INC. GLENHAM, NEW YORK

Submitted to:

Texaco, Inc.
Glenham, New York

O.H. Materials Corp.

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August 20, 1986
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SUMMARY

1 - This report presents a summary of the actions taken to remediate and restore a Texaco Inc. (TEXACO) inactive disposal site in Glenham, Dutchess County, New York, in fulfillment of the Remedial Action Plan approved by the New York State Department of Environmental Conservation (NYSDEC) on June 10, 1985, and as subsequently modified with NYSDEC approval.

2 - In July 1985, TEXACO retained O.H. Materials Corp. (OHM) to implement the Remedial Action Plan. Implementation of the plan by OHM began in August 1985 and was completed in June 1986.

3 - The Remedial Action Plan identified a number of disposal areas which were designated as follows:

- o Container Disposal Site (CDS)
- o Old Sludge Lagoon (OSL)
- o Disposal Pit (DP)
- o Chemical Burial Site 1 (CBS-1)
- o Chemical Burial Site 2 (CBS-2)
- o Chemical Burial Site 3 (CBS-3)

During the course of the remedial action, additional buried materials were uncovered between and to the north of CBS-1 and CBS-2. Consequently, in accordance with a January 1986 NYSDEC-approved modification to the Remedial Action Plan, this additional disposal area, designated the Open Dig Area (ODA), was also remediated. These areas are all shown on Figures 1.3 and 1.4 (see pages 1-4 and 1-5).

4 - The Remedial Action Plan called for the excavated materials to be disposed at the CECOS International Inc. (CECOS) landfill in Niagara Falls, New York. Physical limitations, as agreed to with the NYSDEC, determined the extent of excavation. These limitations involved excavating until all buried waste materials and potentially contaminated soils were removed. Excavation, however, was in no case to extend below bedrock or seasonal, historical low water in a vertical plane and 2 feet beyond the boundaries of the excavation site in the lateral plane. Moreover, excavation in the chemical burial sites was to take place inside a portable steel, aluminum, and fiberglass building with an air-treatment system designed to collect and purify vapors, and thus minimize the possibility of vapors migrating off site.

5 - Table 1 presents a summary of the materials (i.e. buried wastes and potentially contaminated soil) removed from the site for various activities carried out during the remedial action, and disposed at the CECOS landfill. Overall, 1,195 truckloads containing a total of 25,298.25 tons of material were removed.

TABLE 1

SUMMARY OF MATERIALS REMOVED AT THE SITE
AND DISPOSED AT THE CECOS LANDFILL

Activity	Time Period	No. of Truck-loads	Weight of Material (Tons)
Trash removal	08-18-85 - 12-12-85	5	79.76
CDS	09-03-85 - 10-23-85	566	11,805.04
OSL	10-24-85 - 01-04-86	133	2,699.76
CBS-3	10-24-85 - 11-14-85	104	2,047.12
CBS-2	11-13-85 - 01-14-86	260	5,276.46
DP	12-28-85 - 01-02-86	3	62.13
CBS-1	01-03-86 - 01-16-86	39	1,652.44
ODA	01-14-86 - 03-08-86	83	1,639.74
Container Crushing	02-03-86	1	18.32
Demobilization Residue	03-18-86	1	17.48
Total		1,195	25,298.25

6 - Trash removal was one of the initial activities. The Remedial Action Plan had called for the off-site disposal of miscellaneous trash and debris at a local landfill. Because of the unavailability of a landfill at the time of the remediation, however, the Remedial Action Plan was modified in October 1985 with the approval of the NYSDEC. This modification provided for the disposal at CECOS of any trash and debris that gave an indication of probable contamination after sensory inspection or air-quality monitoring (i.e. for volatile organics). Further, the October 1985 modification allowed for the use of the remaining trash and debris as backfill.

On this basis, the trash removal effort generated five truckloads containing 79.76 tons of materials considered to be potentially contaminated. This material was characterized as contaminated soil-nonhazardous and disposed at CECOS's Secure Sludge Management Facility, commonly known as Cell A. All other trash and debris was staged at the site and ultimately used as backfill.

7 - Remediation of the CDS took place between September 3 and October 23, 1985, generating 11,805.04 tons of material which was characterized as contaminated soil-nonhazardous and disposed at CECOS's Cell A. The CDS excavation was carried out in a series of trenches. Each trench was subjected to joint inspection by representatives of TEXACO, the NYSDEC, and OHM. Backfilling of each trench was not permitted to begin until all parties were in agreement that the physical limitations of the Remedial Action Plan had been achieved.

Air-quality monitoring was conducted throughout the site and its perimeter during the course of the CDS excavation. During that period, a total of 6,319 measurements were made for volatile organics using photoionization detection instrumentation (PID), and for total cyanides and sulfides with appropriate instruments. In all cases, cyanides and sulfides were below the detection limits of the instrumentation (i.e., 10 parts per million [ppm]). High humidity conditions during the first 2 weeks of work at CDS affected the PID instrumentation, causing it to malfunction. Thus, excluding measurements taken during these first 2 weeks, of a total of 1,479 PID measurements, 61 (4.1 percent) exceeded 1 ppm and 18 (1.2 percent) exceeded 5 ppm. Over 95 percent of the measurements were, therefore, below instrument detection limits (i.e. 1 ppm). There were no readings above 10 ppm. Moreover, the higher PID measurements, occurring after the first 2 weeks of work at CDS, were in almost all cases also attributable to days with relatively high humidity conditions.

8 - Remediation of the OSL took place between October 24, 1985 and January 4, 1986, generating 2,699.76 tons of material which was characterized as contaminated soil-nonhazardous and disposed at CECOS's Cell A. In contrast to the approach utilized at the CDS, backfilling at the OSL (and also at the chemical burial sites) did not begin until the OSL had been completely excavated. TEXACO, the NYSDEC, and OHM inspected the OSL on December 30, 1985. Backfilling began on January 1, 1986, and was completed on January 4, 1986. Air-quality monitoring was conducted on and around the site throughout the period of the remediation of the OSL. Measurements of volatile organics by a PID, cyanides, and sulfides were, for the most part, below

detection limits. To the extent there were detectable measurements, these were related to work at CBS-3 and CBS-2 which was being carried out concurrently with work at the OSL.

9 - Remediation of CBS-3 took place between October 24 and November 14, 1985, generating 2,047.12 tons of material which was disposed at the CECOS landfill. Of this total quantity, 2,005.15 tons were characterized as contaminated soil-nonhazardous. The remaining 41.97 tons were characterized as hazardous because these materials were excavated from a portion of CBS-3 which, based upon review of historical records, was suspected of having received listed hazardous wastes (i.e. peroxide, hydroperoxide, hydrazine, cyclohexane, and benzene).

The actual CBS-3 excavation was completed on November 11 when bedrock was reached. CBS-3 was the only excavation which terminated on bedrock. Following joint inspection by TEXACO, the NYSDEC, and OHM, backfilling commenced and was completed on November 14.

During remediation of CBS-3, 3,441 measurements for volatile organics, sulfides, and cyanides were taken throughout the site and its perimeter. In all cases, sulfides and cyanides were below detection limits. Of the PID measurements, only 10 (0.9 percent) exceeded 1 ppm. There were two PID measurements greater than 5 ppm, both associated with local conditions well within the site boundary: a measurement of 6 ppm in the vicinity of the loadout pad on November 4 and a mesurement of 7 ppm immediately outside the excavation building on November 8.

10 - Remediation of CBS-2 occurred between November 13, 1985, and January 14, 1986, generating 5,276.46 tons of material which was disposed at the CECOS landfill. Of this total tonnage, 5,195.95 tons were characterized as contaminated soil-nonhazardous. The remaining 80.51 tons were characterized as hazardous because these materials were excavated from a portion of CBS-2 which, based upon review of the historical record, was suspected of having received a listed hazardous waste, vinyldine chloride.

Excavation at CBS-2 was completed on January 7, 1986. The excavation did penetrate the water table which, for most of the time during the CBS-2 excavation, exceeded seasonal low water table levels. The final inspection of the CBS-2 excavation took place on January 10, 1986, at which time representatives of TEXACO, the NYSDEC, and OHM agreed that all buried materials had been removed and the excavation appeared free of any indication of potential contamination. Backfilling was then initiated and was completed on January 14.

During CBS-2 remediation activities, 4,140 measurements for volatile organics, sulfides, and cyanides were taken throughout the site and its perimeter. All cyanide and sulfide measurements were below detection limits. There were 29 PID measurements (2.1 percent) above 1 ppm and three PID measurements above 5 ppm. The measurements above 5 ppm were related to local conditions well within the site boundaries. Measurements taken on November 21 showed 5.6 ppm in the near vicinity of the loadout pad, and 6.2 ppm immediately outside the CBS-2 excavation building. A measurement of 8 ppm immediately outside the excavation building was recorded on November 22.

11 - The DP, which was believed to have been used for the disposal of liquid wastes, was remediated between December 28, 1985, and January 2, 1986. A total of 62.13 tons of material were removed from the DP, characterized as contaminated soil-nonhazardous, and disposal at the CECOS landfill.

12 - Remediation of CBS-1 took place between January 3 and January 16, 1986, generating 1,652.44 tons of material which was disposed at the CECOS landfill. All material removed from CBS-1 was characterized as contaminated soil-nonhazardous.

Water table levels for most of the CBS-1 excavation were slightly above seasonal, historical low water levels. However, because the water table was still below the buried debris being excavated (i.e. a minimum of 6.8 feet below grade), the excavation only slightly penetrated the water table. The site was jointly inspected by representatives of TEXACO, the NYSDEC, and OHM on January 13, and all agreed the excavation was free of buried materials and any signs of potential contamination. Backfilling commenced on January 14 and was completed on January 16.

During CBS-1 excavation activities, 1,620 measurements for volatile organics, sulfides, and cyanides were taken. All sulfide and cyanide measurements were below detection limits. Similarly, all PID measurements were below 1 ppm.

13 - The ODA was remediated between January 14 and March 8, 1986, generating 1,639.74 tons of material which were disposed at the CECOS landfill as contaminated soil-nonhazardous.

During excavation of the ODA, 3,270 measurements of volatile organics, sulfides, and cyanides were taken. All sulfide and cyanide measurements were below detection limits. Only two PID measurements were above

1 ppm: measurements of 30 ppm on January 27 and 200 ppm on February 6, both taken directly over excavated, open drums. These high measurements were strictly local in their occurrence; all other PID measurements at the site on those days and during the entire course of ODA work were below 1 ppm. Both drums and the surrounding soil were overpacked in clean drums, characterized as hazardous waste, and disposed at the CECOS landfill.

On February 21, a drum containing phenol was uncovered. The phenol drum and surrounding soil were overpacked in three drums. These three drums were transported via the Advanced Environmental Technology Corp. (AETC) storage facility in Flanders, New Jersey (EPA I.D. No. NJD080631369), to Stablex Inc. in Rock Hill, South Carolina (EPA I.D. No. SCD044442333), where they were incinerated. The wastewater generated from decontamination of the equipment used to handle the phenol drum and surrounding soil was placed in a separate clean drum which was shipped to Frontier Systems Inc. in Niagara Falls, New York (EPA I.D. No. NYD048815703), for wastewater treatment, also via AETC's storage facility in Flanders, New Jersey.

14 - There were 559 intact containers uncovered during the various site excavations. The contents of these containers were unknown. The containers were crushed on the loadout pad and within the excavation building in accordance with a procedure approved by the NYSDEC. The crushed container material was mixed with a combination of dry sand and lime, resulting in a mixture containing less than 5 percent crushed-container material by weight (less than 100 pounds container material per ton of sand and lime). The residual mixture (i.e., crushed-container material, sand, and lime) weighed 18.32 tons, was characterized as hazardous waste, and was disposed at the CECOS landfill.

15 - There were 57 cylinders and lecture bottles which were uncovered during excavation of the various sites. One of the cylinders was identified as being the property of the Union Carbide Corporation (UCC). UCC removed this cylinder from the site. Two of the remaining cylinders, as a result of on-site sampling, were found to be empty. The remaining 54 cylinders were shipped off site for sampling and analyses. A federal Department of Transportation exception for transportation of these unknowns for laboratory analysis was obtained to allow for proper shipment of these materials. When the results of analyses are complete, the cylinders will be disposed in accordance with all applicable federal and state regulations.

16 - Demobilization took place gradually in relation to the decreasing needs of the project for personnel and equipment. It extended from the middle of February to the end of the third week of March. During demobilization, one last load of material for disposal at CECOS was generated. This load, weighing 17.48 tons, consisted of the pool liner and stabilized sludge from the one remaining liquid storage pool, along with miscellaneous debris generated as part of demobilization.

Final grading of the site also took place in preparation for hydroseeding of the site. Hydroseeding was carried out during the week of June 23, 1986.

17 - During the course of the project, wastewater was produced from the washing of vehicles and equipment, and water was also produced through excavation site dewatering. Overall, ninety-one 5,000-gallon-capacity tanker truckloads of water were removed from the site. The water was shipped to du Pont's Chambers Works in Deepwater, New Jersey (EPA I.D. No. NJD002385703), for wastewater treatment.

1.0 INTRODUCTION

This report describes the actions taken to remediate and restore a Texaco Inc. (TEXACO) inactive disposal site in Glenham, Dutchess County, New York (see Figures 1.1 and 1.2). The site had been used in the past by the Texaco Research Center Beacon (TRCB) for the disposal of small quantities of chemicals and materials generated as by-products of research and development activities and the routine operations and maintenance of the facility.

At TRCB's request, O.H. Materials Corp. (OHM) prepared a Site Investigation Report (Section 10.0, Reference 1) and a Remedial Action Plan (Section 10.0, Reference 2), both dated February 8, 1985. With minor revisions, the Remedial Action Plan was approved by the New York State Department of Environmental Conservation (NYSDEC) on June 10, 1985. It was implemented, as revised, by OHM from August 1985 through March 1986.

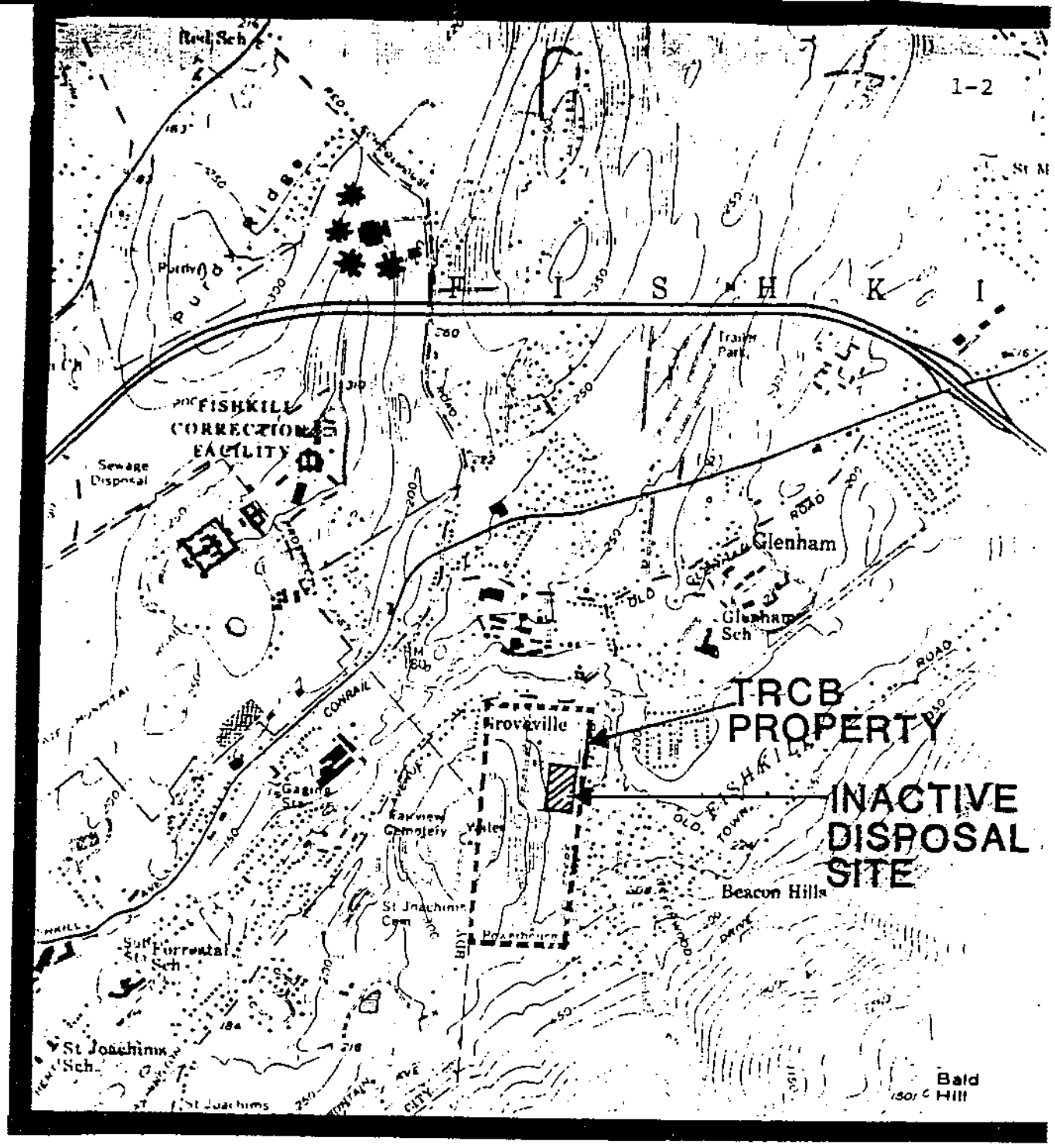
The Remedial Action Plan identified several disposal areas (shown on Figure 1.3) designated by TRCB as follows:

- Container Disposal Site (CDS)
- Old Sludge Lagoon (OSL)
- Disposal Pit (DP)
- Chemical Burial Site 1 (CBS-1)
- Chemical Burial Site 2 (CBS-2)
- Chemical Burial Site 3 (CBS-3)

The plan called for the excavation and removal of contaminated materials within each individual area. Excavation in the chemical burial sites was to take place inside a portable steel, aluminum, and fiberglass building containing an air-treatment system designed to collect and purify vapors, and thus minimize the possibility of vapors migrating off site. The excavated soil in bulk and any containers were to be transported to and disposed at the CECOS International Inc. (CECOS) landfill in Niagara Falls, New York. Miscellaneous materials (i.e., trash and debris) were to be transported to a nearby landfill as determined by TEXACO.

During the course of the remedial action, additional buried materials were uncovered between and to the north of CBS-1 and CBS-2. This disposal area was designated as the Open Dig Area (ODA, Figure 1.4). Materials were excavated from the ODA and then disposed at the CECOS landfill.

The objective of this report is to discuss the work carried out by OHM and the data generated. The voluminous air-quality monitoring and water-level measurement data, as well as the solid and liquid manifest records, are on file at TRCB and are available for review. In addition, OHM



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HORIZONTAL SCALE (MILE)

FIGURE 1.1
SITE LOCATION
INACTIVE DISPOSAL SITE
TEXACO RESEARCH CENTER
BEACON
PREPARED FOR
TEXACO INC.
GLENHAM, NEW YORK

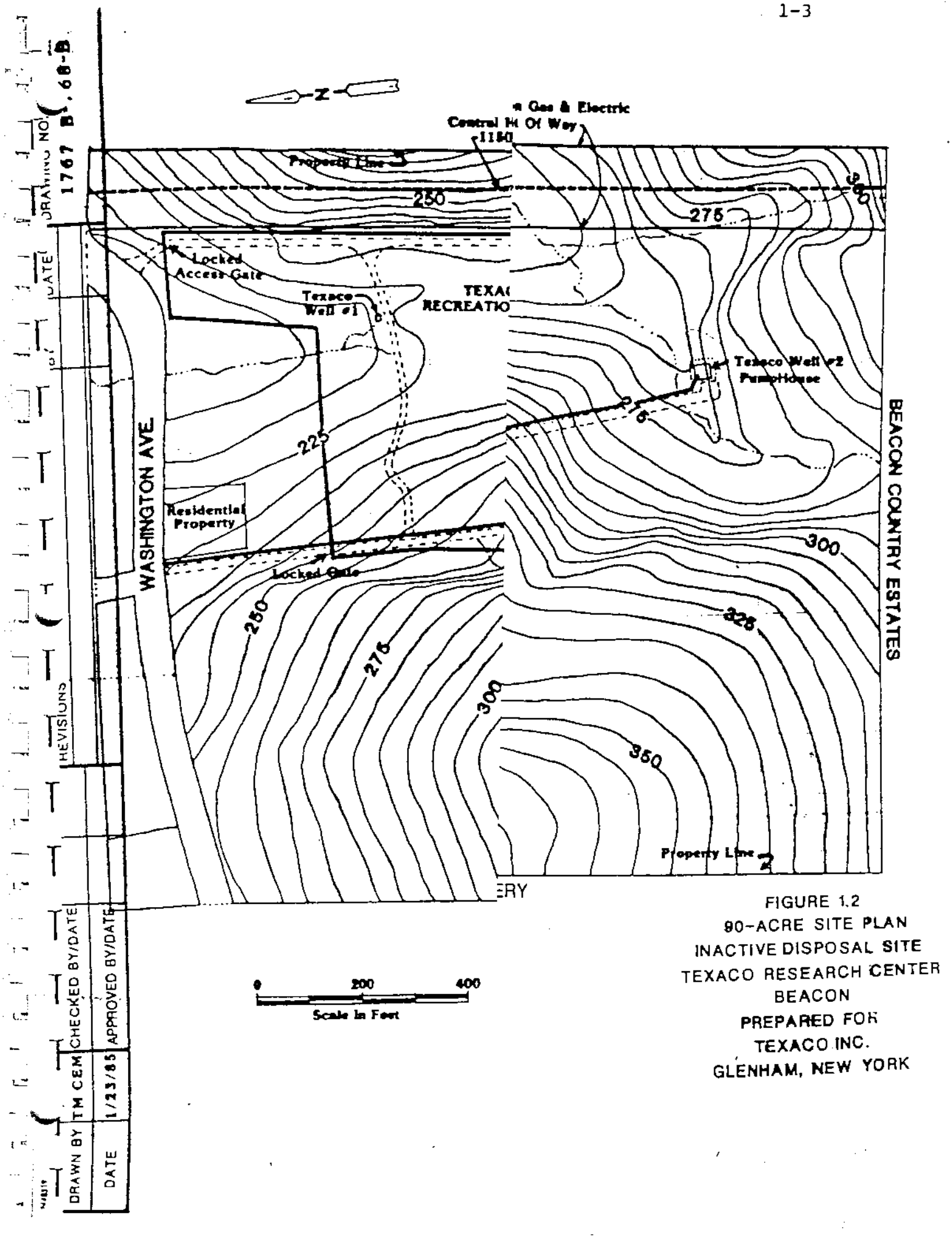

FIGURE 1.2
90-ACRE SITE PLAN
INACTIVE DISPOSAL SITE
TEXACO RESEARCH CENTER
BEACON
PREPARED FOR
TEXACO INC.
GLENHAM, NEW YORK

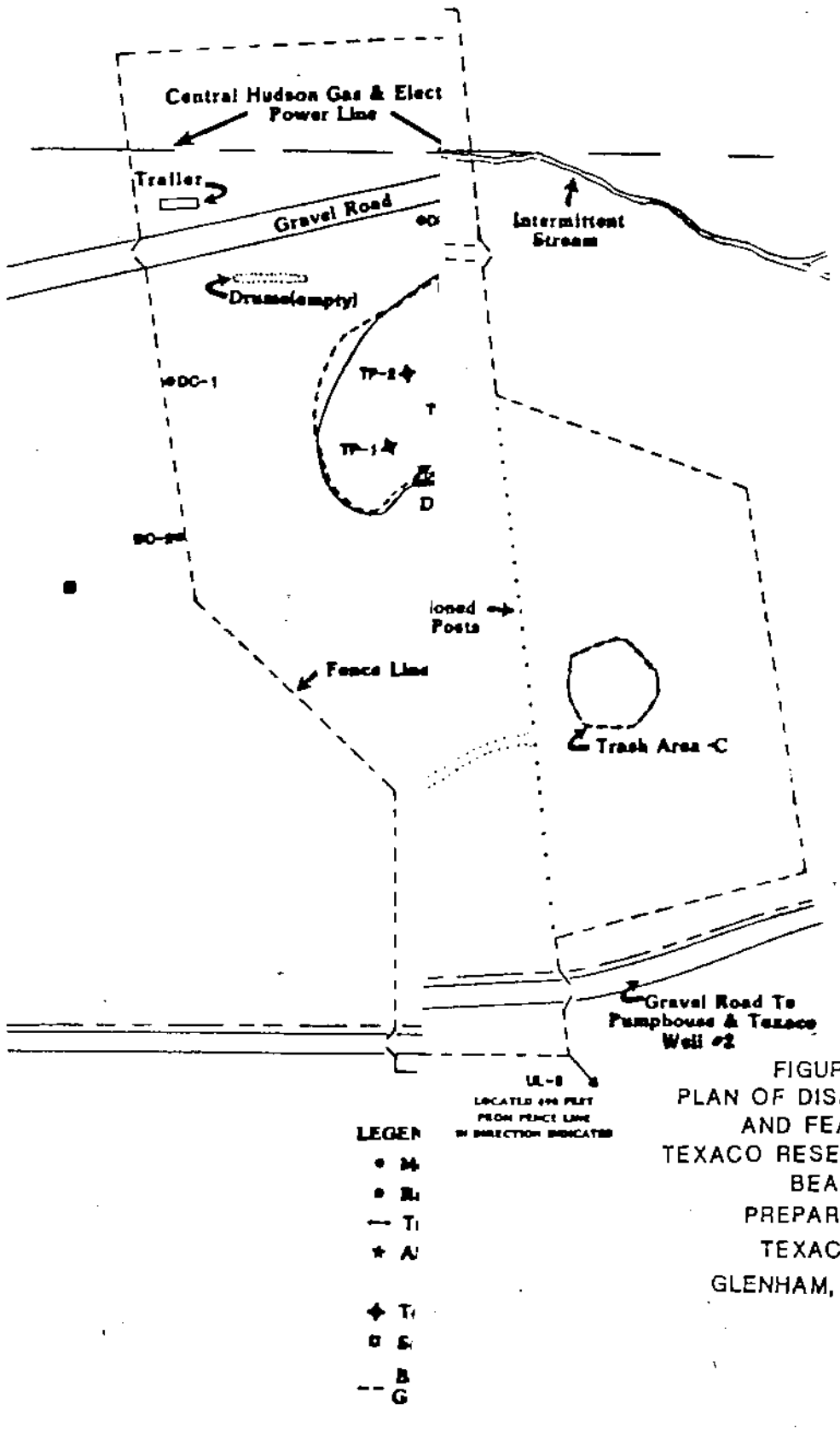

FIGURE 1.3
PLAN OF DISPOSAL SITE
AND FEATURES
TEXACO RESEARCH CENTER
BEACON
PREPARED FOR
TEXACO INC.
GLENHAM, NEW YORK

DRAWN BY TM CE CHECKED BY/DATE APPROVED BY/DATE
DATE 3/24/86
REVISIONS
DATE
DRAWING NO. 1767 B-768-C

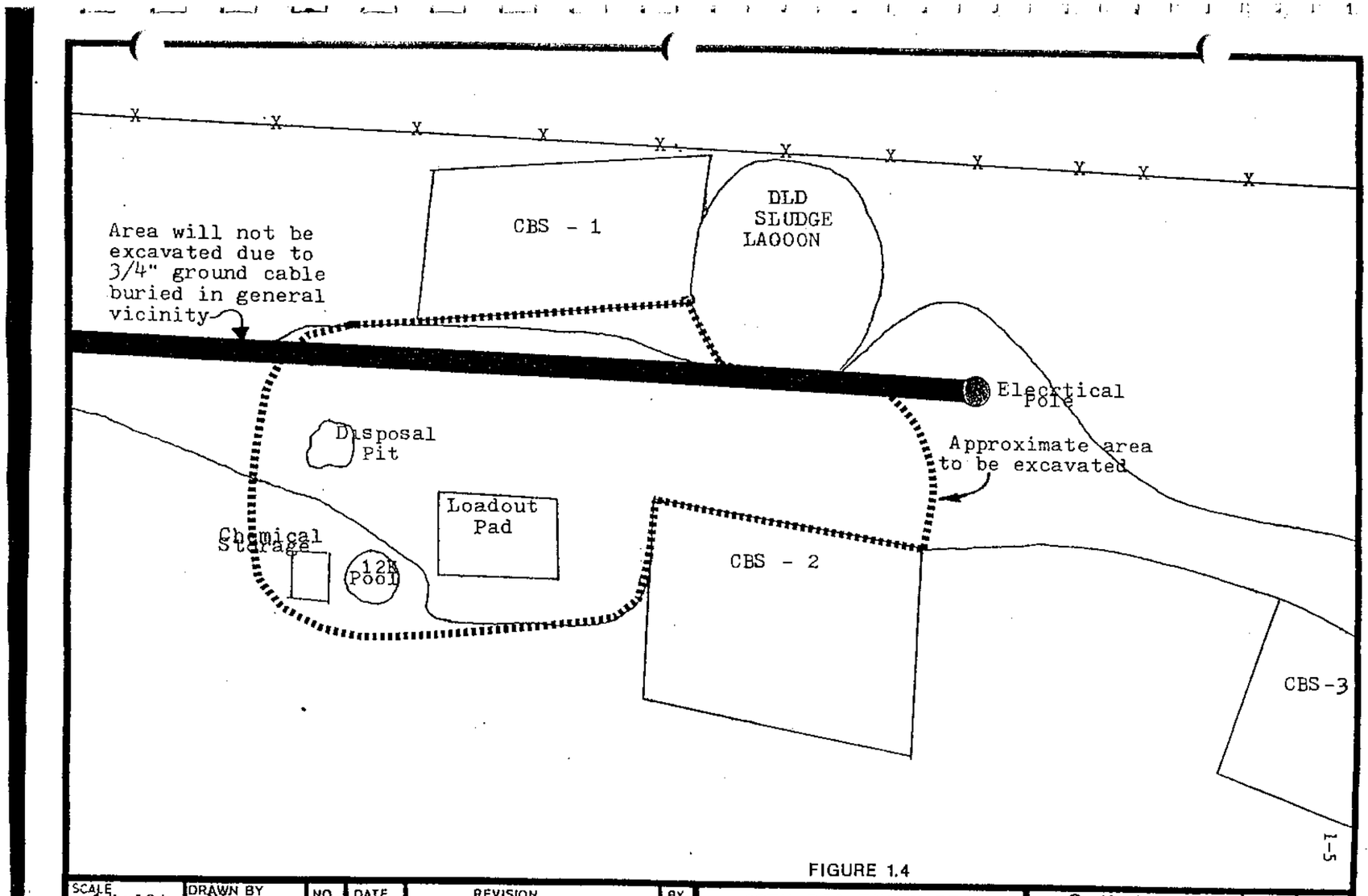

FIGURE 1.4

SCALE 1"=50'	DRAWN BY ME	NO.	DATE	REVISION	BY	OPEN DIG EXCAVATION TEXACO RESEARCH CENTER BEACON	O. H. MATERIALS CO. EMERGENCY RESPONSE AND ENVIRONMENTAL RESTORATION BOX 551 FINDLAY, OHIO 419/423 3526 800/537-9540
DATE 1/21/86	CHECKED						PROJECT 2997 / DRAWING / REVISION
SHEET 1 OF 1	APPROVED ME						

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prepared weekly detailed progress reports during the entire period of the project. These reports are also on file at TRCB.

This report is organized to present the major work activities in roughly the chronological order in which they were performed, as follows:

Section/Activity

2.0 Mobilization and Setup
3.0 Trash Removal
4.0 Old Sludge Lagoon
5.0 Container Disposal Site
6.0 Chemical Burial Sites and Disposal Pit
7.0 Open Dig Area
8.0 Containers and Cylinders
9.0 Demobilization and Site Restoration

Summaries of the air-quality monitoring and water-level measurement data obtained throughout the course of the remedial action are presented as part of the discussion of each of the remediation activities. The site safety and contingency plans, along with any modifications to these plans developed during the remediation, are presented in Appendix A.

Prior to mobilization and setup, a soil sampling and analysis program was conducted to develop waste characterizations required in connection with the land burial of excavated materials. On July 18 and 19, 1985, a total of 22 samples were taken at the various disposal areas, as follows: 10 at CDS, 3 at CBS-3, 2 at CBS-2, 1 at the OSL, and 6 at CBS-1 and the DP. Sample depths ranged from 2 1/2 feet to 7 1/2 feet and were at times determined by reaching ground water or hitting an impenetrable object. The samples were analyzed by the RECRA Research, Inc. (RECRA) laboratory in Amherst, New York, and the results of these analyses were reported to OHM on August 29, 1985. A copy of the RECRA report is presented as Appendix B.

Based on the assessment of the RECRA analytical data by TEXACO and OHM, it was concluded that the materials excavated from the various disposal areas would be, for the most part, nonhazardous. Consequently, all materials removed from the disposal areas were designated as contaminated soil-nonhazardous unless there was a reasonable basis, either from historical records or subsequent analytical data, to suspect the materials contained a listed hazardous waste. In such an event, the excavated materials were designated as a hazardous waste.

2.0 MOBILIZATION AND SETUP

Mobilization and setup took place from August 13, through September 3, 1985. This phase included the mobilization of project personnel, equipment, and support facilities such as the office, galley, and decontamination trailers, as well as construction/installation of the decontamination pad, truck staging/loadout area pad, truck scale, and site drainage system. The site layout after completion of mobilization and setup is depicted in Figure 2.1. Specific activities that were carried out during this period included:

Mobilizing Personnel - Key personnel included a site supervisor, project engineer, project chemist, foreman, and equipment operating engineers.

Upgrading Access Roads - Stone was spread over the surface of existing dirt and gravel access roads to accommodate the heavy vehicle traffic anticipated.

Clearing Brush - Brush was cleared in and near the CDS area. During this activity monitoring well UC-1 (Figure 1.3) was damaged. In April 1986, this well was replaced by another well at the same location, and this new well is currently in use.

Installing Utilities - Arrangements were made for on-site electric and telephone service and a potable water supply provided by TEXACO.

Constructing Site Drainage System - Diversion trenches and berms were constructed in the vicinity of the various disposal sites to divert runon, contain runoff, and reduce possible infiltration.

Constructing Decontamination Pad and Washwater Sump - A concrete decontamination pad with curbing on all sides was constructed. The pad was sloped to a sump where washwater could be stored prior to being pumped to a storage pool.

Constructing Staging/Loadout Area Pad - A concrete staging/loadout pad measuring approximately 60 feet by 30 feet was constructed. The objective of this pad was to eliminate the potential for contamination of clean soil under the staging area and to create an adequate area for stockpiling material.

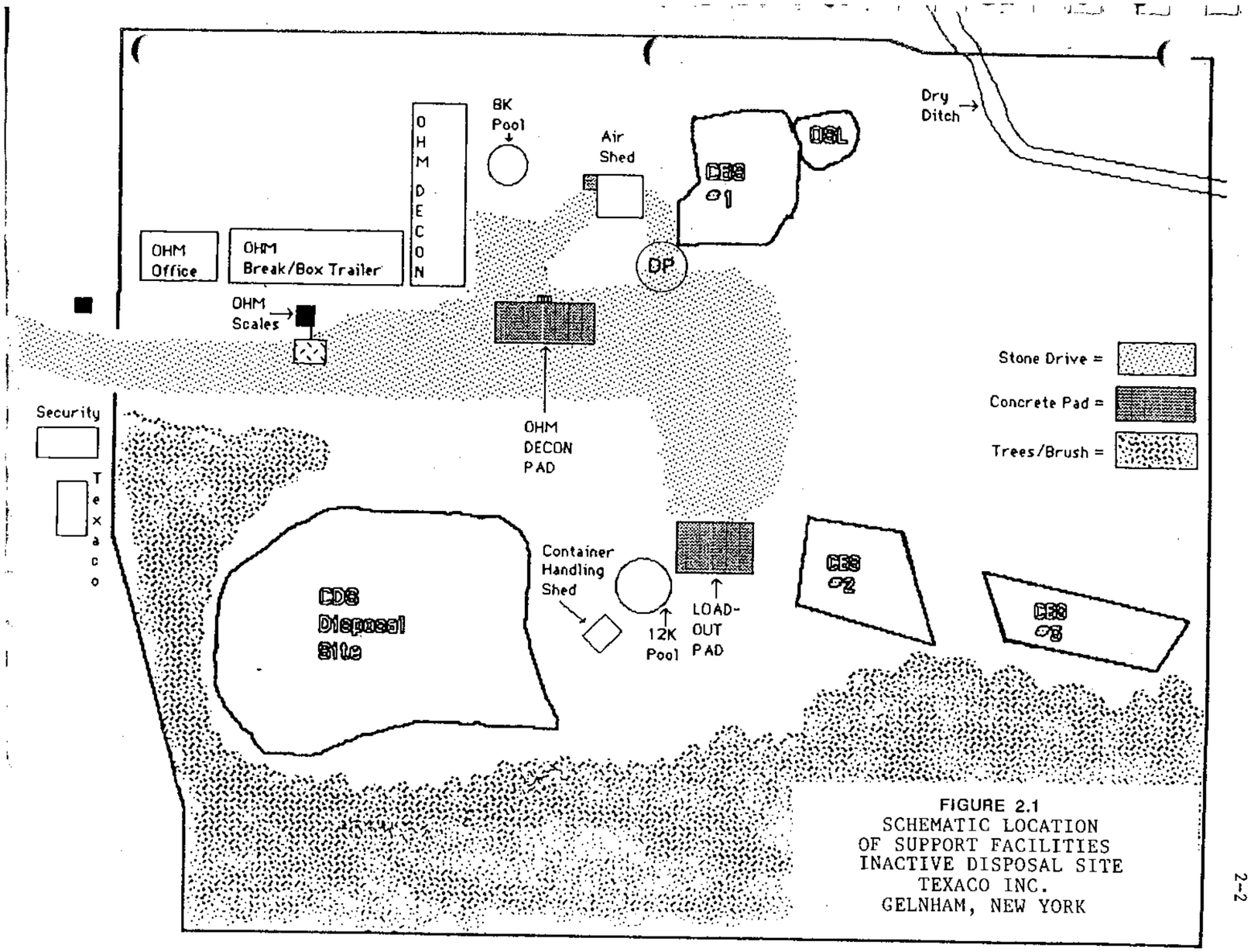

FIGURE 2.1
SCHEMATIC LOCATION
OF SUPPORT FACILITIES
INACTIVE DISPOSAL SITE
TEXACO INC.
GELNHAM, NEW YORK

Setting Up Truck Scale - An axle scale was set up to weigh trucks both prior to and after loading to assure compliance with highway weight limitations.

Setting Up Support Trailers - Trailers were set up at the site for use as a field office, personnel decontamination area, protective clothing and equipment storage area, crew member eating and break area, and a point from which security guards could control ingress to and egress from the site.

Designating Transition Building - A temporary building was provided for workers' use while changing into personal protective clothing prior to entering the disposal site area and to store self-contained breathing apparatus and air cylinders.

Designating Container Handling/Storage Facility - A temporary building was provided to store, sample, and package containers segregated during excavation.

Erecting Water Storage Pools - 8,000- and 12,000-gallon storage pools were erected to store water collected prior to being transported for off-site disposal.

It should be noted that, during construction of the staging/loadout pad, several empty containers were uncovered. These containers and the immediate surrounding soil were staged at the CDS for subsequent off-site disposal with CDS materials. In addition, an open drum containing a white powder was uncovered. This drum was overpacked in a clean drum and staged at the Container Handling/Storage Facility for future off-site disposal. Prior to overpacking, a sample of the white powder was taken. Laboratory analyses determined the substance to be a nonhazardous silica gel. Air-quality monitoring in the vicinity of the uncovered drum with a photoionization detector (PID) and with hydrogen sulfide and cyanide monitors showed no increases above background levels.

3.0 TRASH REMOVAL

The Remedial Action Plan called for the removal of all trash, debris, and brush material before commencing any excavation of contaminated materials.

TRCB had used four areas specifically for the disposal of trash. These were designated as Trash Areas A, B, C and D (Trash Areas-A, -B, -C, and -D, Figure 1.3). The Site Investigation Report concluded that these areas had not been used for disposal of hazardous materials and that the trash could be disposed at a sanitary landfill. A suitable sanitary landfill, however, could not be found within the needed time frame, and it became necessary to modify the Remedial Action Plan. The modification, which was approved by the NYSDEC, provided for:

1. Staging materials from Trash Areas-A, -B, and -D and any miscellaneous trash and debris at the site, which was in any way questionable as to cleanliness based on sensory inspections or air quality monitoring, at the CDS for subsequent off-site disposal along with CDS materials

2. Staging temporarily the remaining trash and debris from Trash Areas-A, -B, -D and from the site in general at the site of Trash Area-A

3. Excavating the more remote Trash Area-C, at a later stage in the project, with off-site disposal at CECOS of any Trash Area-C materials which were determined to be questionable as to cleanliness based on sensory inspection or air monitoring

4. Using the temporarily staged nonhazardous trash and debris at the Trash Area-A site, along with clean materials excavated at the Trash Area-C site, as fill at the Trash Area-C excavation

In accordance with this modification, Work Items (1) and (2) above were carried out concurrently with mobilization and setup. Work at Trash Area-C was initiated on September 14, 1985, with a preliminary investigation to determine the extent of trash and debris at the site and to determine the overall boundaries of the excavation that would be required for disposal of all trash pile materials at this site.

As part of this investigation, four trenching excavations were made in Trash Area-C which uncovered several drums, all of which were either open headed or partially

crushed and broken. Based upon conclusions OHM drew in its Site Investigation Report, it is likely these drums contained sand to place on top of ice in winter, or were used for the disposal of grass clippings and trash, both of which were routine operations. In addition to these drums, a black powder, most likely ash, and several bricks were found. TEXACO decided that materials like these (i.e, empty containers, bagged materials, or visually stained or odiferous materials) should be separately staged for subsequent disposal at the CECOS landfill, even though no evidence of contamination in this area had been determined in the OHM Site Investigation Report.

The actual remediation activities at Trash Area-C began on October 26, 1985, with the preparation of a stone access road to the trash pile. Excavation was initiated on October 27. Any material which was questionable as to cleanliness was separately staged from material considered to be clean. Notwithstanding the nonhazardous nature of Trash Area-C materials based upon the OHM Site Investigation Report, as a precautionary measure, all work was carried out using Level C personal protective clothing and air-purifying respirators. Soiled clothing and equipment were transported from Trash Area-C in the bucket of a front-end loader for off-site disposal or for cleaning at the decontamination facility set up by OHM for the project. Vehicle washing also took place at this facility. (See Appendix A for the Site Safety Plan developed for work at Trash Area-C.)

As part of the excavation on October 27, one drum, containing bags of white powder, was found. This powder was subsequently identified as nonhazardous silica gel which had also been present near the loadout pad and analytically tested. At the time it was uncovered, however, because its appearance was similar to that of asbestos, breathing-air equipment was used on October 28, and a separate staging area was established for this material and any similar material that might be found. No additional material with these characteristics was uncovered. The material found on October 27 was ultimately disposed at the CECOS landfill, characterized as contaminated soil-nonhazardous. Work at Trash Area-C was temporarily suspended after October 28 because of equipment needs for other aspects of the project.

PID measurements taken on October 28 were all below equipment detection limits (1 part per million [ppm]), including readings taken directly over two drums that were uncovered that day. In addition, cyanide and sulfide measurements were below equipment detection limits (10 ppm). Measurements on October 29, after work had stopped, showed that volatile organic, cyanide, and sulfide concentrations were all below detection limits.

Work resumed at Trash Area-C on December 2, 1985. As at the initiation of remediation work at Trash Area-C in October, Level C personal protective gear was utilized. All materials TEXACO had previously designated (i.e. containers, bagged materials, visually stained, or odiferous materials) were transported from the staging area to the loadout pad for disposal at CECOS. The only containers found were empty bottles (mostly soft drink bottles) and broken/crushed drums. No intact containers or drums were found.

On December 4, after the site was completely cleared of all trash, debris, and discarded materials, it was back-filled with clean soil, along with trash, and debris which had been removed from Trash Area-C and the other trash pile areas and previously staged at the Trash Area-A site.

The air-quality measurements taken from December 2 through 4 show maximum hourly PID measurements on two occasions (out of total of 10) to be 1 ppm. All other PID hourly measurements were below instrument detection limits. Cyanides and sulfides were below detection limits in all cases. Because of the low PID measurements, crew members backfilled the site in Level D protection.

The material that was removed from Trash Area-C and stored at the loadout pad was removed for disposal to the CECOS landfill on December 12. Five truckloads containing 79.76 tons of material, characterized as contaminated soil-nonhazardous, were disposed at CECOS's Secure Sludge Management Facility (Facility I.D. No. 32B22) located in Niagara Falls, New York. This facility is commonly referred to as CECOS's Cell A. Table C.1 in Appendix C presents a tabulation of the work order number and material weight for each truckload.

4.0 CONTAINER DISPOSAL SITE

A description of remediation activities at the CDS is provided in the subsections below.

4.1 REMEDIATION PROCEDURE

The excavation was carried out in a series of trenches. Material was excavated using a trackhoe and transported to the loadout pad using a front-end loader. The bucket of the loader was equipped with a lid to prevent spillage of contaminated soil. Any intact containers or cylinders encountered by the trackhoe were transferred to the front-end loader bucket and transported to the Container Handling/ Storage Facility. Monitoring wells in the vicinity of the CDS, as well as in the vicinity of the other excavation sites, were secured with metal drums to prevent damage to the well casings.

All OHM personnel working at this excavation site wore Level B personal protective equipment, including the operator of the loader used to transport the excavated materials. The operator loading trucks and performing the backfill operation wore Level C safety gear, as did personnel involved in truck loading and truck decontamination. All safety measures were in compliance with the OHM Site Safety Plan approved by the NYSDEC (see Appendix A).

In accordance with the Remedial Action Plan, physical limits were to determine the depth as well as the lateral extent of excavation. The first requirement was that the excavation would terminate if the top of bedrock was encountered. Soil would be removed from the top of bedrock to make it as soil-free as possible, but bedrock would not be excavated. The second requirement was that the excavation would terminate when the bottom of buried material or the low seasonal (year-round) water table was reached. Where the bottom of the buried material was higher than the low seasonal water table, all potentially contaminated soil between the buried material and the water table was to be removed. The lateral extent of excavation in any direction was to be 2 feet beyond the limit of any buried material.

Consequently, at the completion of the excavation of each individual trench, an inspection was conducted by representatives of TEXACO, NYSDEC, and OHM. When all parties concurred that all buried materials had been removed and that the bottom of the trench appeared free of potential contamination, the trench was immediately backfilled with clean fill material. Clean fill for backfilling was obtained from the high ground (i.e., 100 feet above the disposal site's elevation) at the western portion of the TEXACO recreation area (Figure 1.2).

On the loadout pad, a second front-end loader was used to maintain the stockpile and to loadout trucks for ultimate disposal. Material stockpiled on the loadout pad was covered with polyethylene at the end of each work day to protect it from rainfall and to reduce dust and odors. The trucks that were loaded with materials from the loadout pad were lined with polyethylene sheeting, tarped, and decontaminated prior to leaving the site. These trucks were restricted as to their hours of movement through the local school area. All material removed from the CDS was characterized as contaminated soil-nonhazardous and disposed at CECOS's Cell A.

4.2 REMEDIATION

Excavation at the CDS commenced on September 3, 1985, and was completed on October 19. Backfilling was completed on October 23. The last two truckloads of CDS material were removed from the loadout pad and transported to CECOS on October 21. Overall, a total of 566 truckloads containing 11,805.04 tons of material were removed. Table 4.1 presents the number of truckloads per day and the weight of material removed. Appendix C, Table C.2, includes a tabulation of the work order number and weight of material for each truckload of CDS materials.

4.3 AIR MONITORING

During the work at the CDS, air-quality monitoring was conducted daily using a PID and cyanide- and sulfide-detection instrumentation. Typically, measurements were taken at 20 sampling locations (see Figure 4.1) several times each day. Table 4.2 summarizes the air-quality monitoring for the September 3 through October 23, 1985, period of the CDS excavation. During that period, 2,123 measurements of each of volatile organics, cyanides, and sulfides were taken. In all cases, cyanide and sulfide measurements were below the detection limits of the instrumentation (10 ppm).

There were 399 PID measurements (18.8 percent) above 1 ppm, 195 PID measurements (9.2 percent) above 5 ppm, and 5 PID measurements (0.2 percent) above 10 ppm. However, the bulk of the higher PID measurements occurred during the first 2 weeks of work at CDS when instrument performance was affected by high humidity. Consequently, examining the period from September 19 through October 23 shows that, out of a total 1,479 PID measurements 61 (4.1 percent) exceeded 1 ppm, 18 (1.2 percent) exceeded 5 ppm, and ther were no measurements above 10 ppm. Moreover, the higher PID measurements occurring after the first 2 weeks of work at CDS, were in almost all cases also attributable to days with relatively high humidity conditions.

TABLE 4.1

MATERIAL REMOVED FROM THE
CDS AND DISPOSED AT CECOS

Date	No. of Truck-loads	Weight (tons)	Date	No. of Truck-loads	Weight (tons)
9/4	7	155.60	9/26	13	279.57
9/5	6	30.83	9/28	11	237.08
9/6	8	159.71	9/30	18	375.08
9/9	12	234.15	10/1	18	379.38
9/10	8	158.04	10/2	6	127.97
9/11	21	436.60	10/8	24	486.28
9/12	12	249.41	10/9	11	221.18
9/13	17	362.77	10/10	25	509.57
9/14	2	43.47	10/11	10	206.72
9/16	22	464.74	10/12	10	213.22
9/17	19	398.77	10/14	21	433.04
9/18	30	631.51	10/15	19	415.92
9/19	17	356.50	10/16	28	579.62
9/20	28	597.59	10/17	15	304.95
9/21	3	61.72	10/18	28	569.04
9/23	28	598.18	10/19	20	398.41
9/24	19	395.63	10/20	5	101.29
9/25	23	490.08	10/21	2	41.42

TOTAL TRUCKLOADS = 566
TOTAL WEIGHT OF MATERIALS REMOVED = 11,805.04 tons

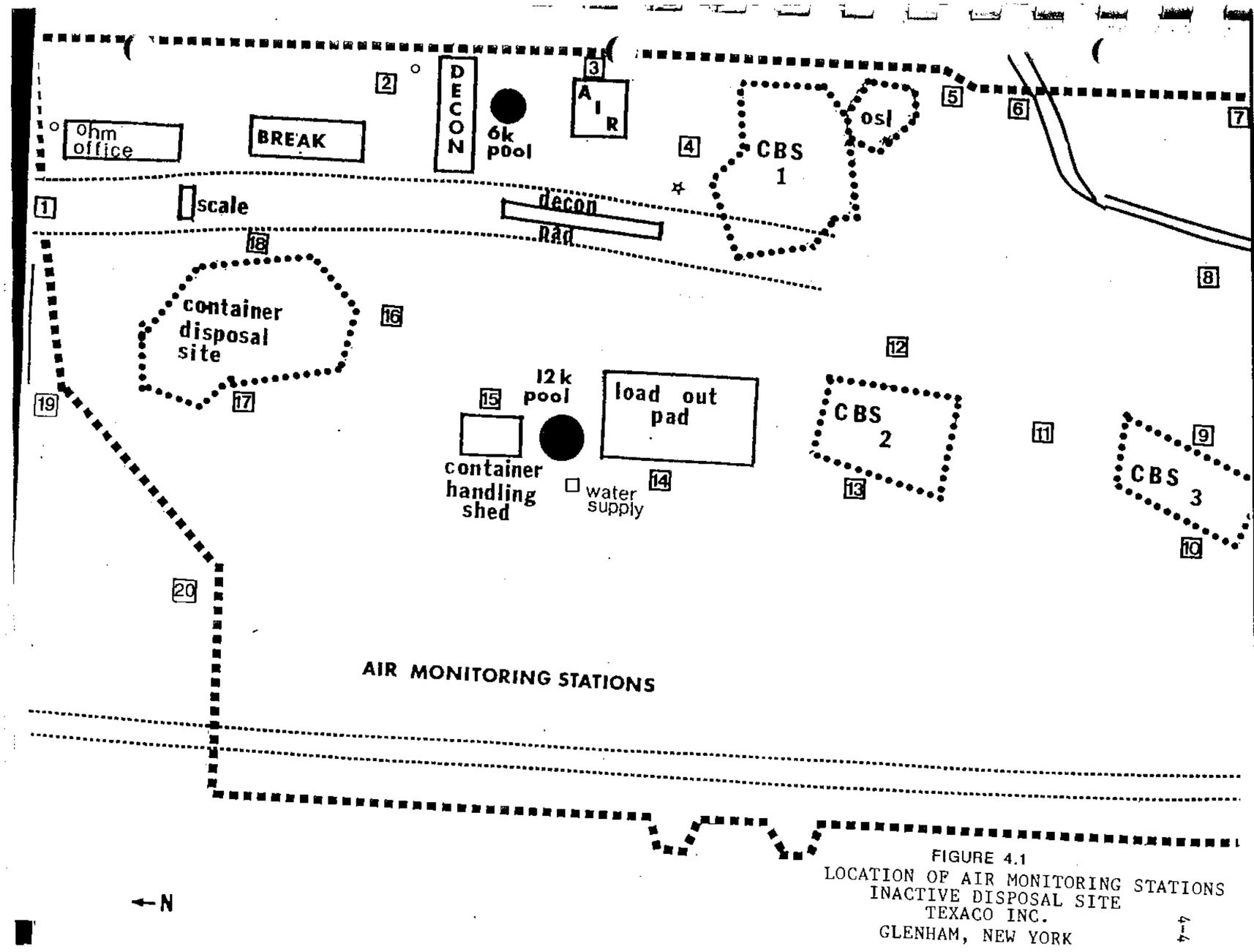

FIGURE 4.1
LOCATION OF AIR MONITORING STATIONS
INACTIVE DISPOSAL SITE
TEXACO INC.
GLENHAM, NEW YORK

TABLE 4.2

AIR MONITORING DATA FOR THE CDS

SEPTEMBER 3 THROUGH OCTOBER 23, 1985

Volatile Organics by Photoionization Detection

Total No. of Measurements	Measurements Above 1.0 ppm		Measurements Above 5.0 ppm		Measurements Above 10.0 ppm	
	No.	%	No.	%	No.	%
2,123	399	18.8	195	9.2	5	0.2
(Excluding measurements taken prior to September 19, 1985)						
1,479	61	4.1	18	1.2	0	0

Cyanides

Total number of measurements = 2,123

All measurements were below the detection limits of the instrumentation (10 ppm)

Sulfides

Total number of measurements = 2,123

All measurements were below the detection limits of the instrumentation (10 ppm)

4.4 WATER TABLE LEVELS

During the course of work at CDS, ground-water levels were very near to or below historical low water levels. Tables 4.3 and 4.4 present the water table depth records for several wells across the site. Measurements at Wells DC-1 and DC-2 in the vicinity of CDS showed ground-water levels to range between 0.9 feet below and 0.6 feet above historical low water.

There is a relatively high ground-water table in the CDS area and, consequently, the water-table depth below-grade ranged between 2.2 feet and 4.1 feet. It was necessary to frequently dewater the excavation site, probably because of the combination of the naturally occurring high water table and considerable precipitation during work at the CDS.

4.5 DISPOSAL OF LIQUIDS

Table 4.5 lists the tanker loads of liquids removed from the site during the course of the CDS remediation. There were 38 tanker shipments during the period with each tanker having a 5,000-gallon capacity. These liquids were a combination of decontamination washwater and liquid generated through the dewatering of the CDS excavation site. The liquid removed from the site was transported to the du Pont Company Chambers Works at Deepwater, New Jersey, for treatment and ultimate disposal.

TABLE 4.3

WATER TABLE DEPTH RECORD

	CDS Vicinity Wells				CBS-3 Vicinity Well	
	DC-1		DC-2		DB-16	
Date	Difference from Low Water (ft)	Depth Below Grade (ft)	Difference from Low Water (ft)	Depth Below Grade (ft)	Difference from Low Water (ft)	Depth Below Grade (ft)
9/03	-0.7	4.1	-0.9	3.7	**	12
10/09	0.4	3.0	0.6	2.2	**	12
10/31	N/A*	N/A	N/A	N/A	**	12

*N/A - No measurements were obtained from these wells

**Well dry water table below top of bedrock

TABLE 4.4

WATER TABLE DEPTH RECORD

	CBS-2 Vicinity Wells				CBS-1 and the OSL Vicinity Wells			
	DB-13		DB-7		DB-8		DB-14	
Date	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)
9/03	-0.9	12.0	-0.2	6.9	-4.5	12.1	-3.3	15.2
10/09	0.1	11.0	0.7	6.0	2.1	5.5	-2.8	14.7
10/31	-0.3	11.4	0.2	6.9	-2.5	10.1	N/A	N/A
11/19	0.2	10.9	0.9	5.9	0.1	7.5	N/A	N/A
11/20	0.2	10.9	0.7	6.0	-0.1	7.7	N/A	N/A
11/21	2.1	8.9	2.6	4.1	1.1	6.4	-0.3	12.2
11/23	2.1	8.9	2.6	4.1	0.9	6.7	0.2	11.7
11/24	2.0	9.1	2.5	4.2	0.9	6.7	0.3	11.6
11/25	-0.1	11.2	0.5	6.2	-1.2	8.8	-1.7	13.6
11/27	0.1	11.0	1.6	5.1	-0.9	8.5	-1.2	13.1
12/01	0.9	10.2	1.5	5.2	1.3	6.3	0.1	11.8
12/02	1.1	10.0	1.8	4.9	1.5	6.1	0.8	11.1
12/03	1.3	9.8	1.6	5.1	1.2	6.4	0.1	11.8
12/16	1.0	10.0	1.6	5.1	1.3	6.3	0.9	11.1
12/17	1.3	9.8	1.2	5.5	1.4	6.2	1.0	10.9
12/18	1.5	9.6	1.3	5.4	1.6	6.0	0.9	11.0
12/20	1.3	9.8	1.5	5.2	2.1	5.4	1.4	10.6
12/21	1.1	9.9	1.1	5.6	1.1	6.5	1.4	10.6
12/23	1.6	9.5	1.1	5.6	1.3	6.3	1.5	10.5
12/27	1.2	9.9	0.8	5.9	0.8	6.8	1.5	10.4
12/28	0.7	10.4	-0.7	7.4	-0.6	8.2	1.4	10.6
12/29	0.7	10.4	0.3	6.4	0.2	7.4	1.3	10.6
12/30	0.5	10.5	-0.7	7.4	0.1	7.5	1.4	10.6
12/31	0.6	10.5	0.3	6.4	-0.1	7.7	1.3	10.6
1/01	0.5	10.6	0.6	6.1	-0.3	7.9	0.5	11.4
1/02	0.6	10.5	0.7	6.0	-0.1	7.7	1.3	10.6
1/03	0.6	10.5	0.7	6.0	N/A*	N/A**	1.4	10.5
1/04	0.3	10.8	0.8	5.9	N/A	N/A	1.3	10.6
1/05	0.4	10.7	0.6	6.1	N/A	N/A	1.9	10.1
1/06	0.4	10.7	0.5	6.2	N/A	N/A	2.5	9.4
1/07	0.3	10.8	0.2	6.5	0.8	6.8***	2.1	9.8
1/08	0.3	10.8	0.3	6.4	0.0	7.6***	1.3	10.6
1/09	0.1	11.0	0.0	6.7	N/A	N/A	1.7	10.2
1/10	0.3	10.8	0.3	6.4	0.5	7.1***	1.8	10.1

TABLE 4.4 (CONTINUED)

WATER TABLE DEPTH RECORD

	CBS-2 Vicinity Wells				CBS-1 and the OSL Vicinity Wells			
	DB-13		DB-7		DB-8		DB-14	
Date	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)	Diff. from Low Water (ft)	Depth Below Grade (ft)
1/11	0.3	10.8	0.7	6.0	N/A	N/A	1.7	10.2
1/12	1.4	9.7	1.0	5.7	N/A	N/A	2.0	9.9
1/13	0.1	11.0	1.0	5.7	N/A	N/A	1.7	10.2
1/14	0.1	11.0	1.7	5.0	N/A	N/A	1.5	10.4
1/15	0.0	11.1	0.9	5.8	0.1	7.5***	1.4	10.5
1/16	0.1	11.0	0.9	5.8	N/A	N/A	1.3	10.6
1/18	0.1	11.0	1.0	5.7	N/A	N/A	1.7	10.2

* No measurements were obtained from these wells.

** Well DB-8 was removed during excavation, and measurements could no longer be taken.

*** Well DB-8 measurements were extrapolated based on measurement at Well DB-14.

TABLE 4.5

RECORD OF CDS WATER TRANSPORTED
TO THE CHAMBERS WORKS

SEPTEMBER 3 THROUGH OCTOBER 23, 1985

Date	Release Number	Date	Release Number
9/13	1	10/07	20
9/13	2	10/07	21
9/16	3	10/07	22
9/17	4	10/08	23
9/20	5	10/08	24
9/25	6	10/08	25
9/27	7	10/08	26
9/28	8	10/09	27
9/28	9	10/09	28
9/28	10	10/09	29
10/01	11	10/11	30
10/01	12	10/11	31
10/02	13	10/15	32
10/03	14	10/15	34
10/04	15	10/16	33
10/04	16	10/18	35
10/05	17	10/18	36
10/05	18	10/19	37
10/07	19	10/21	38

5.0 OLD SLUDGE LAGOON

Remediation and disposal activities at the OSL are discussed below.

5.1 REMEDIATION

Excavation at the OSL commenced on October 24, 1985. Material was excavated using a trackhoe and either transferred from the trackhoe to a loader or staged at the OSL site or at the loadout pad. The material was then loaded onto trucks.

The approach used for excavating and backfilling the OSL differed from the approach used at the CDS in that the OSL was not backfilled until it had been completely excavated. At the CDS, excavation was carried out in a series of trenches with each individual trench being inspected and backfilled prior to excavation at the succeeding trench. The small size of the OSL in comparison to the CDS allowed for its complete excavation prior to inspection and backfilling. Each truck containing OSL material was tarped and decontaminated before leaving the site, and all OSL material was characterized as contaminated soil-nonhazardous.

With the exception of the two truckloads removed on November 23, all materials from the OSL were disposed at CECOS's Cell A. Because of an incorrect coding of the manifests, the two truckloads on November 23 (representing 39.07 tons), were disposed at CECOS's Secure Chemical Management Facility (SCMF) at Niagara Falls, New York, which is an approved hazardous-waste disposal facility.

Excavation at the OSL was completed on December 27, 1985. Overall, a total of 133 truckloads containing 2,699.76 tons of material from the OSL were removed. Table 5.1 presents the number of truckloads removed daily and the weight of the material. Appendix C, Table C.3, presents the work order number and weight of materials for each truckload of OSL material.

The OSL was inspected and approved for backfilling by TEXACO, the NYSDEC, and OHM on December 30, 1985, and backfilling began on January 1, 1986. Backfilling was completed by January 4, 1986.

Prior to initiating backfilling operations, NYSDEC and OHM personnel prepared a composite sample made up of several aliquots drawn from the bottom of the OSL excavation. This composite sample was split by TEXACO and sent to NANCO Laboratories for independent analysis.

TABLE 5.1

MATERIAL REMOVED FROM THE OSL
AND DISPOSED AT CECOS

Date	No. of Truck-loads	Weight (tons)	Date	No. of Truck-loads	Weight (tons)
10/24	2	42.50	11/05	9	198.30
10/25	9	177.17	11/23	2	39.07
10/26	9	176.73	12/15	5	102.73
10/28	12	216.41	12/17	4	77.08
10/29	9	189.57	12/18	7	154.54
10/30	6	116.03	12/20	22	476.98
10/31	8	160.35	12/23	3	47.59
11/01	12	253.85	12/27	14	270.86

TOTAL NUMBER OF TRUCKLOADS = 133
TOTAL WEIGHT OF MATERIALS REMOVED = 2,699.76 TONS

5.2 AIR MONITORING

Air-quality monitoring was conducted on and around the site throughout remediation activities at the OSL. The results of this monitoring program are discussed as part of the discussions of work at CBS-3 and CBS-2 which was performed concurrently with work at OSL. In brief, air-quality measurements during work at the OSL were, for the most part, at or near background levels, or less than the detection limits of the instrumentation. To the extent that there were detectable measurements above background levels, these were attributable to conditions at the CBS-3 and CBS-2 excavation sites or at the loadout pad. These situations are discussed in the following section of the report as part of the CBS-3 and CBS-2 discussions.

5.3 WATER TABLE LEVELS

Water table levels during the OSL work are presented on Table 4.4. Readings at Well DB-8 are most representative of conditions at the OSL. As shown in Table 4.4, water levels at DB-8 increased from below historical low water near the end of October to 2.1 feet above historical low water on December 20, 1985. During that period, the water table rose from 10.1 feet below grade to 5.4 feet below grade. Between December 20 and the end of the month, water table levels decreased to 7 to 8 feet below grade.

As at the CDS, the OSL site had to be dewatered frequently. Because work at OSL was performed concurrently with work at CBS-3 and CBS-2, water removed during the period of OSL work represented a combination of water generated through the dewatering of the OSL, CBS-3, and CBS-2 as well as through site and equipment decontamination activities. Table 5.2 presents the record of water shipments from the site during the October 24, 1985, through January 13, 1986, period encompassing work at all three of the aforementioned sites as well as at CBS-1. During this period there were a total of 49 tanker shipments, each having a 5,000-gallon capacity. The water was shipped as nonhazardous. As with liquids from the CDS, these water shipments were disposed at du Pont's Chambers Works at Deepwater, New Jersey.

TABLE 5.2

RECORD OF WATER TRANSPORTED
TO THE CHAMBERS WORKS

OCTOBER 24, 1985, THROUGH JANUARY 13, 1986

Date	Release Number	Date	Release Number
10/30	39	12/15	64
11/06	40	12/15	65
11/13	41	12/15	66
11/13	42	12/20	67
11/19	43	12/20	68
11/19	44	12/22	69
11/20	45	12/23	70
11/20	46	12/23	71
11/21	47	12/23	72
11/21	48	12/27	73
11/22	49	12/27	74
11/26	50	12/28	75
12/02	51	12/28	76
12/02	52	12/28	77
12/03	53	12/28	78
12/04	54	12/30	79
12/13	55	01/02	80
12/13	56	01/03	81
12/13	57	01/04	82
12/14	58	01/04	83
12/14	59	01/05	84
12/14	60	01/06	85
12/14	61	01/08	86
12/14	62	01/13	87
12/14	63		

6.0 CHEMICAL BURIAL SITES AND DISPOSAL PIT

Remediation activities at CBS-1, -2, and -3 as well as the DP are described below.

6.1 REMEDIATION PROCEDURE

Excavation at the chemical burial sites was performed inside a portable building intended to contain fumes generated by excavation below the floor level. The building was approximately 40 feet long by 28 feet wide and consisted of a steel frame with aluminum and fiberglass wall and roof panels. There was a geotextile fabric draped over the siding to enhance the containment of fumes generated during excavation. The building was mounted on steel skids to allow it to be moved from site to site.

During excavation, the building was connected to an air-treatment system consisting of a 5,000 CFM, 25 Hp fan, 20-inch-diameter ducting, and two vapor-phase carbon cell units. The vapor-phase carbon cells were used to absorb organic compounds in gases released during the excavation. Additionally, the vents from the carbon units were kept at a distance from the building and were always directed away from the nearby residential areas.

The excavation procedure was similar to that implemented at the CDS with the exception that the trackhoe remained within the building and the loaders outside the building. Material was transferred from the trackhoe to the loader through the building entranceway after manually removing the polyethylene sheeting which covered the entranceway during excavation. As done at the CDS, the loader would then transport excavated materials to the loadout pad prior to its removal from the site.

Prior to initiating excavation within the building, the overburden at each burial site was removed and staged for subsequent use as clean backfill. This material was examined visually and with air-quality monitoring equipment to confirm its noncontamination.

Excavation proceeded from the south side of the site, starting with CBS-3, toward the northeast portion of the site, ending with CBS-1. Removal at each burial site was completed prior to initiating excavation at the next site. The DP, which appeared to be contiguous with CBS-1, was excavated in conjunction with work at CBS-1.

Excavation continued at each site until the physical limitations as defined by the Remedial Action Plan were reached. These limitations were previously discussed in connection with the CDS remediation (Section 4.0). They

TABLE 6.1

MATERIAL REMOVED FROM CBS-3
AND DISPOSED AT CECOS

Date	No. of Truck-loads	Weight (tons)	Date	No. of Truck-loads	Weight (tons)
10/25	4	67.65	11/5	6	124.48
10/29	1	19.01	11/6	17	338.42*
10/30	2	38.35	11/7	10	187.78
10/31	4	80.28	11/8	18	354.62
11/1	3	60.09	11/9	7	143.19
11/2	3	61.19	11/11	14	266.72
11/4	15	305.34			

TOTAL NUMBER OF TRUCKLOADS = 104
TOTAL WEIGHT OF MATERIAL REMOVED = 2,047.12

*Included 41.97 tons which were shipped as hazardous

On November 11, 1985, CBS-3 was inspected by TEXACO, the NYSDEC, and OHM and approved for backfilling. The excavation site was backfilled, starting on November 14, with clean fill made up of the overburden from CBS-3 and CBS-2 and soil excavated from a borrow area located on the western portion of the TEXACO recreation area.

As done at the OSL, prior to initiating backfilling, sampling of the CBS-3 excavation site by the NYSDEC was conducted. Four composite samples were obtained from 27 different sampling points throughout the bottom and side of the excavation. At the same time, background samples were taken approximately 280 feet west of the parking lot/tennis court in an undisturbed wooded area in the TEXACO recreation area near the site where backfill material was being obtained. These samples were split by TEXACO and submitted to NANCO Laboratories for independent analysis.

6.2.2 Air Monitoring

During the excavation at CBS-3, air-quality monitoring was conducted daily with volatile organics, sulfide, and cyanide detection instrumentation. Measurements were taken on the site, around the site perimeter, at the exhaust of the carbon filters, around the excavation building, and at the loadout pad. (See Figure 4.1 for the location of the monitoring stations). Table 6.2 summarizes the air monitoring data for this period. Overall during the October 24 through November 11 period, 3,441 measurements for volatile organics, sulfides, and cyanides were taken. In all cases, sulfides and cyanides were below the detection limits. Of the PID measurements, only 10 (0.9 percent) exceeded 1 ppm. There were two PID measurements greater then 5 ppm: a measurement of 6 ppm in the near vicinity of the loadout pad on November 4, and a measurement of 7 ppm in the near vicinity of CBS-3 on November 8. The measurement at the loadout pad occurred during loading operations and was attributed to the excavation of organics, oils, greases, and solvents which occurred earlier that day. The November 8 measurement may have been related to substances which were being excavated at that time.

On November 7, excavation within the containment building uncovered some soils having a mercaptan-like odor, thereby causing some odor problems. Mercaptan, an older chemical name which literally means "mercury-seizing," refers to any group of organic compounds resembling alcohols, but that have oxygen of the hydroxyl group replaced by sulfur. "Thiol" is the newer name of this chemical class which, in many cases, is characterized by a strong, repulsive odor similar to that of decayed cabbage. When the offensive soils were uncovered, excavation was stopped to determine the odor source, and air monitoring was conducted.

TABLE 6.2

AIR MONITORING DATA FOR CBS-3

OCTOBER 24 THROUGH NOVEMBER 11,1985

Volatile Organics by Photoionization Detection

No. of Measurements	Measurements Above 1.0 ppm		Measurements Above 5.0 ppm	
	No.	%	No.	%
1,147	10	0.9	2	0.2

Cyanides

Number of Measurements - 1,147

All measurements were below the detection limits of the instrumentation (10 ppm)

Sulfides

Number of Measurements - 1,147

All measurements were below the detection limits of the instrumentation (10 ppm)

On November 7, 213 measurements of volatile organics, cyanides, and sulfides were taken throughout the site and its perimeter, at the exhaust of the carbon filters, and in particular, around CBS-3. All measurements were either at background levels or below detection limits.

On November 8, an additional 393 measurements were taken. Of these measurements, there were only three volatile organics measurements above 1 ppm: the aforementioned reading of 7 ppm in the vicinity of CBS-3 and readings of 2 ppm and 1.7 ppm at the carbon cell vent.

During the afternoon on November 9, a small fire occurred inside the containment building when excavating unearthed a can containing a white powder. The can ruptured, issuing fire and smoke. For a brief period, to maintain personnel safety, the building was evacuated except for the equipment operator extinguishing the source material. The can was packed inside a stainless-steel drum with clean soil, capped, and transported to the storage shed and tagged. On November 9 and 10, 186 measurements of volatile organics, cyanides, and sulfides were recorded. There were six volatile organics measurements above 1 ppm, with a maximum measurement of 1.4 ppm in the near vicinity of the excavation building.

6.2.3 Water Table Levels.

During the course of work at CBS-3 water table levels were below historical low water (See Table 4.3). The historical low water table elevation near CBS-3 is below the top of bedrock. Consequently, CBS-3 was excavated to bedrock.

6.3 CHEMICAL BURIAL SITE 2

6.3.1 Remediation

Excavation at CBS-2 commenced on November 13, 1985, with the removal of overburden and the staging of excavated materials on the loadout pad. Work at the site, however, was halted on November 14 because of adverse weather conditions (continuous rain). Excavation resumed on November 19, and the first three truckloads of CBS-2 material were removed from the site on November 20. Table 6.3 presents a daily summary of the number of truckloads and weight of material removed from CBS-2. Appendix C, Table C.5, includes a tabulation of the work order number and weight of material for each truck load of CBS-2 materials.

Overall, a total of 260 truckloads containing 5,276.46 tons of material were removed from CBS-2. Of this total, 256 truckloads containing 5,195.95 tons were

TABLE 6.3

MATERIAL REMOVED FROM CBS-2
AND DISPOSED AT CECOS

Date	No. of Truck-loads	Weight (tons)	Date	No. of Truck-loads	Weight (tons)
11/20	3	55.08	12/19	19	374.66
11/21	15	309.55	12/21	8	150.01
11/22	5	105.97	12/22	4	90.14
11/23	10	188.32	12/23	12	253.72
11/25	8	163.29	12/27	3	70.15
11/26	12	247.45	12/28	4	84.29
12/1	18	359.81	12/29	16	311.94*
12/2	13	261.61	12/30	5	116.74
12/13	22	453.43	12/31	8	151.48
12/14	10	215.11	1/2	9	157.54
12/16	18	382.08	1/5	3	52.86
12/17	18	379.77	1/7	5	95.45
12/18	12	246.01			

TOTAL NUMBER OF TRUCKLOADS = 260
TOTAL WEIGHT OF MATERIALS REMOVED = 5,276.46 TONS
*Includes 80.51 tons shipped as hazardous

designated as contaminated soil-nonhazardous. The remaining four loads, containing 80.51 tons, represented the excavation of Cells 1 through 4 which took place on December 29. The historical record had indicated that a listed hazardous waste, vinyldine chloride, may have been deposited in one of these cells and, as a precaution, all four cells were designated as a hazardous waste for disposal purposes. Using a procedure similar to that used at CBS-3, excavated material from these cells was transferred directly from the loader onto the transportation trucks, bypassing the loadout pad.

Designated as a hazardous waste, the material from these cells was disposed at the CECOS SCMF. As with CBS-3, it was TEXACO's intent, notwithstanding the nonhazardous characterization of the bulk of the CBS-2 waste material, to dispose all these materials at the CECOS SCMF. Because of restrictions imposed by CECOS resulting from the limited capacity of this facility, however, a shutdown of the project occurred between December 2 and 12. All waste materials disposed from December 12 onward which were designated as nonhazardous would only be permitted by CECOS to be disposed at its Cell A. Only materials characterized as hazardous could be disposed at the SCMF. Consequently, CBS-2 waste materials which were disposed on December 2 and before were disposed at the SCMF. CBS-2 materials disposed after December 12, with the exception of the materials removed from Cells 1 to 4, were disposed at CECOS's Cell A.

Excavation at CBS-2 was completed on January 7, 1986, and final inspection took place on January 10, 1986. At this inspection, representatives of TEXACO, the NYSDEC, and OHM concurred that all buried materials had been removed and that the excavation appeared free of any indication of contamination. At that time, all parties agreed that the site could be backfilled. Using soil taken from the hillside to the immediate west of CBS-2, backfilling was initiated on January 10 and completed on January 14.

Prior to commencing backfilling activities at CBS-2, the NYSDEC prepared a composite sample of the excavation site made up of aliquots from 22 different locations. This composite sample was split by TEXACO and sent to NANCO Laboratories for independent analysis.

6.3.2 Air Monitoring

Air-quality monitoring (volatile organics, cyanide, and sulfide measurements) was conducted daily on and around the site, at the exhaust of the carbon filters, and around the excavation building and loadout pad. Overall, during the November 13, 1985, through January 7, 1986, period, 4,140 measurements for volatile organics, sulfides, and cyanides were taken. Table 6.4 summarizes the results of these measurements. In all cases, sulfides and cyanides

TABLE 6.4

AIR MONITORING DATA
FOR CBS-2

NOVEMBER 13, 1985, THROUGH JANUARY 7, 1986

Volatile Organics by
Photoionization Detection

No. of Measurements	Measurements Above 1.0 ppm		Measurements Above 5.0 ppm	
	No.	%	No.	%
1,380	29	2.1	3	0.2

Cyanides

Number of Measurements - 1,380

All measurements were below the detection limits of the instrumentation (10 ppm)

Sulfides

Number of Measurements - 1,380

All measurements were below the detection limits of the instrumentation (10 ppm)

were below detection limits. Similarly, the bulk of the volatile organics measurements were either at background levels or below detection limits. Overall, there were only 29 measurements (2.1 percent) above 1 ppm. There were three measurements greater than 5 ppm: a measurement of 5.6 ppm in the near vicinity of the loadout pad and a measurement of 6.2 ppm right outside the CBS-2 excavation building, both recorded on November 21; and a measurement of 8 ppm, also outside the excavation building recorded on November 22.

While the higher measurements on November 21 cannot be attributed to any particular occurrence, the measurement on November 22 resulted from the fracture of a sealed glass container during the excavation. At the time of the fracture, a gaseous cloud was released, and the OHM chemist at the excavation site recorded a volatile organics measurement inside the excavation building of 20 ppm. Within 30 minutes, measurements were down to approximately 2 ppm. The OHM senior chemist and general foreman then examined the location of the gaseous release. They found pieces of what appeared to be sodium metal and a glass cylinder tube. These articles were placed in a green plastic bag and put into a sealed drum to keep them from the air. The drum was staged at the Container Handling/Storage Building for subsequent disposal.

After this occurrence on November 22, at the request of NYSDEC and with concurrence by TEXACO, work was suspended to examine the excavation building and to make modifications, as necessary, to improve the building's air tightness. Excavation within the building resumed on November 24 and proved to be quite effective from that point on.

In particular, this was evidenced by occurrences on December 27 and 28. Excavation on December 27 resulted in a slight odor release which was immediately remediated by application of activated carbon. On December 28, a small reaction occurred producing smoke which was contained for the most part within the building and exhausted through the carbon filters. On both days, PID measurements in the vicinity of the excavation building, including those directly downwind of the carbon filters, were below 1 ppm. In fact, on those 2 days, there was only one measurement above 1 ppm. This was a measurement of 3 ppm or December 27 which occurred at the loadout pad. This measurement was attributed to the exhaust from the loader operating on the loadout pad.

In addition to the occurrences of November 22 and December 27 and 28, which took place during the excavation process, there was one additional odor release on December 14 while repositioning the excavation building over CBS-2 to resume work after the project shutdown

(December 2 through 12). It is believed that a rubber-tired loader, used to move the building, broke through the soil surface and fractured a container just below the surface. OHM field chemists conducting routine perimeter air monitoring at that time noticed a mercaptan-like odor. The odor was carried by a strong, gusty northwest wind to the residential areas nearby. One of the residents noticed the odor and, concerned that it might have resulted from a natural gas leak, brought it to the attention of the local fire department. As a result, OHM met with a representative of the fire department and described the apparent source of the odor. In addition, to eliminate the odor problem, the soil believed to contain the source material was moved to the loadout pad and covered with polyethylene sheeting. A TEXACO representative relayed this information to the nearby resident.

On December 15, in an attempt to load out this material, four trucks were loaded. Odors were again released which were detected by local residents. Consequently, the loadout effort was halted and the odorous soils were restored to the loadout pad and again, covered with polyethylene sheeting. On December 16, after loadout pad materials were blended with other soil, activated carbon, and methyl ethyl acetate (i.e., banana oil), all the materials on the loadout pad were removed without incident. TEXACO answered and responded to resident phone calls throughout these occurrences.

During the December 14 through 16 period, 564 measurements of volatile organics, cyanides, and sulfides were taken. All cyanides and sulfides were below detection limits. All PID readings were either at background levels or below 1.0 ppm.

6.3.3 Water Table Levels

Table 4.4 summarizes the water table depth record in the vicinity of CBS-2 (Wells DB-13 and DB-7). Water levels rose during the CBS-2 excavation from almost historical low water at the start of the excavation in mid-November, to 2.0 to 2.6 feet above historical low water in late November.

During the latter part of December and in early January, water levels decreased, reaching less than 0.5 feet above historical low water during the later stages of the excavation (January 7). Correspondingly, the water table ranged between 8.9 and 11.2 feet below grade at DB-13 and between 4.1 and 7.4 feet below grade at DB-7.

Because of the proximity of the water table to grade, particularly in the northeastern portion of CBS-2, and because of surface infiltration, it was necessary to frequently dewater the excavation site. Ground water removed

from the excavation was disposed, along with decontamination washwater and water removed from the OSL excavation, at du Pont's Chambers Works. Table 5.2 presents a record of shipments during this period.

6.4 CHEMICAL BURIAL SITE 1 AND THE DISPOSAL PIT

6.4.1 Remediation

The DP which had been used for miscellaneous liquid disposal was located adjacent to CBS-1. The exploratory excavation of slit trenches to uncover the DP was initiated on December 26. This effort was unsuccessful but was resumed on December 28 when the DP was actually located. The excavation of the DP was performed on December 30 and 31. The procedure used was similar to that used for excavation of the OSL which consisted of an open excavation with direct loading of trucks at the disposal site. A total of three truckloads containing 62.13 tons of material were removed from the DP. During the excavation in the DP area, five scattered drums were uncovered. These drums, along with material excavated at the DP, were disposed at CECOS's Cell A. Appendix C, Table C.6, presents the work order number and weight of material for each truckload of DP materials. The DP was backfilled with clean soil.

On January 1, in an attempt to define the boundaries of CBS-1, exploratory excavations were performed in the vicinity of the southeast boundary of CBS-1, adjacent to the chain-link fence at the eastern property line. These excavations only uncovered clean soil, indicating that CBS-1 did not extend to the property line. On January 2, the excavation building was positioned over the area of the exploratory excavations. Actual excavation within the building commenced on January 3 with the excavation being carried out in trench-like fashion. Each individual trench was excavated from south to north, and excavation proceeded from trench to trench in an east-to-west direction. The first trench immediately adjacent to the property line contained mostly clean soil and it was concluded, at that time, that excavation was taking place outside the CBS-1 site. Excavation did proceed, however, with excavated materials being subjected to sensory and air-quality monitoring inspections. Soil determined to be clean based on these inspections was stockpiled south of the OSL to be used as backfill material. All other excavated materials were transferred to the loadout pad for ultimate disposal. As excavation proceeded from east to west, there were signs that the site had been used for waste burial and in fact, after the first 3 days (after January 5) of excavation at CBS-1, excavated materials were transported to the loadout pad.

CBS-1 did not exhibit the well-defined cell structure that was found to exist at both CBS-2 and CBS-3. (This may have been because CBS-1 was the first of the burial sites and TEXACO may have modified its disposal approach after filling CBS-1.) Thus, while apparently contaminated materials were found, they could not be identified as being part of any particular cell. This precluded the disposal of materials in Cells 16 and 17, which had been suspected of having received a listed hazardous waste, phenol, as hazardous. Two drums of phenol had been identified in TEXACO's historical records as having been disposed in these cells. These cells could not be identified, and there were no other signs of phenol waste materials. No cells containing two drums were excavated. All materials transported to the loadout pad from CBS-1 were disposed at CECOS's Cell A.

Table 6.5 presents a daily summary of the number of truckloads and weight of material removed from CBS-1. Appendix C, Table C.6, includes a tabulation of the work order number and weight of material for each of these truckloads. Overall, a total of 89 loads containing 1,652.44 tons of material were removed from CBS-1. The site was jointly inspected by representatives of TEXACO, the NYSDEC, and OHM on January 13, and all were in agreement that the site was free of buried materials and signs of contamination and that the site could be backfilled. Backfilling with clean soil was initiated on January 14 and continued to January 16.

Prior to commencing backfilling operations at CBS-1, the NYSDEC prepared a composite sample of the excavation site made up of aliquots from 20 different locations. This composite sample was split by TEXACO and sent to NANCO Laboratories for independent analysis.

6.4.2 Air Monitoring

Air-quality monitoring (PID, cyanide, and sulfide measurements) was conducted daily during work at CBS-1. Overall, during the January 1 through January 13 period, 1,620 measurements for volatile organics, sulfides, and cyanides were taken. In all cases, sulfides and cyanides were below detection limits. Similarly, all the volatile organics measurements were below 1.0 ppm.

6.4.3 Water Table Levels

Table 4.4 summarizes the water table depth record in the vicinity of CBS-1 (Wells DB-8 and DB-14). Because Well DB-8 was removed during the initial stages of work at CBS-1, water levels at DB-8 have been extrapolated from readings at DB-14. Extrapolated water levels at DB-8,

TABLE 6.5

MATERIAL REMOVED FROM CBS-1
AND DISPOSED AT CECOS

Date	No. of Truck-loads	Weight (tons)
1/4	4	88.33
1/5	3	49.84
1/7	15	270.88
1/8	15	288.29
1/9	10	197.70
1/10	12	224.63
1/11	10	181.06
1/12	4	73.66
1/13	12	202.37
1/14	4	75.68

TOTAL NUMBER OF TRUCKLOADS = 89
TOTAL WEIGHT OF MATERIALS REMOVED = 1,652.44 TONS

for the period of the CBS-1 excavation, ranged between 0.1 feet below historical low water (7.7 feet below grade) and 0.8 feet above historical low water (6.8 feet below grade). At DB-14, water level readings ranged between 1.3 feet above historical low water (10.6 feet below grade) to 2.5 feet above historical low water (9.4 feet below grade).

REPORT FOR CERTIFICATION OF THE CLOSURE OF THE HAZARDOUS WASTE SLUDGE LAGOON AT THE TEXACO RESEARCH CENTER BEACON, NEW YORK

EPA NO. NYD091894899

Prepared by:

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New York State
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July 15, 1986

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July 15, 1986

Mr. Harold J. Weiss
Project Manager
Research & Environmental Affairs Department
Texaco Research Center
P.O. Box 509
Beacon, New York 12508

RE: Texaco Research Center Beacon
Report for Certification of the Closure of the
Hazardous Waste Sludge Lagoon
Facility EPA I.D. No. NYD091894899

Dear Mr. Weiss:

I am pleased to submit, herewith, my report on the closure of the hazardous waste sludge lagoon at the Texaco Research Center Beacon. Lagoon closure was initiated in early February 1986 and completed in late March 1986. Final grading and seeding of the former lagoon site was performed on June 23, 1986. I was present during the course of the lagoon closure and attest that the closure was carried out in accordance with the closure plan as approved by the New York State Department of Environmental Conservation.

My report presents a description of the activities that were conducted and the data generated in connection with the closure of the lagoon. It also includes my formal certification, as required by 40 CFR Part 265 and 6NYCRR Part 373-3, that the lagoon has been closed in accordance with the aforementioned closure plan.

If I may be of any further assistance, please advise.

Sincerely,

John L. Leporati, P.E.
New York State Professional
Engineer License No. 47204

JLL:jl

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1.0 INTRODUCTION

Texaco Research Center Beacon (TRCB) (formerly known as "Beacon Research Laboratories") is a Texaco Inc. owned and operated facility located on approximately 50 acres of land in Glenham, New York. Texaco also owns an additional 90 acres of undeveloped land in close proximity to this facility. TRCB is an on-shore, non-production, non-transportation laboratory complex engaged in research, development and technical services related to petroleum products and energy. Petroleum and coal products, solvents and various chemical compounds are used at this plant in connection with the research functions.

In November 1980, the TRCB submitted to Region II of the U.S. Environmental Protection Agency (EPA) Part A of a permit application for on-site treatment and storage of hazardous wastes. One of the units identified on the Part A application was a surface impoundment (lagoon) receiving sludges from a sanitary wastewater treatment system and from a laboratory wastewater treatment system; these sludges were considered hazardous wastes because they contained small amounts of solvents listed in 40 CFR Part 261, Subpart D. Texaco decided to close the sludge lagoon, and accordingly submitted, on March 30, 1984, a closure plan in accordance with federal and state hazardous waste regulations. This closure plan was revised through discussions with the New York State Department of Environmental Conservation and finalized on September 26, 1985 (Reference 1).

During November and December 1985, the closure plan was further modified by agreement between Texaco and the New York State Department of Environmental Conservation (References 2 and 3). The modification related specifically to the procedures to be used for the truck loading of excavated materials during remediation at the lagoon.

Implementation of the plan, as modified, was initiated in February 1986 and the lagoon was closed by late-March 1986 with final grading and seeding accomplished by late June. This report presents a description of the activities conducted and the data generated in connection with closure of the lagoon. It also provides the required formal certification that the lagoon has been closed in accordance with the aforementioned plan.

2.0 DESCRIPTION OF LAGOON

The lagoon was located on undeveloped property approximately 1,600 feet south of Fishkill Creek. The main Research Center complex, located north of the creek, was separated from the lagoon by the Fishkill Creek, a Dutchess County road and by property owned by Conrail. Topographic and geologic site maps, which were prepared by Dunn Geoscience Corporation (Reference 4) and included in the closure plan, are presented with this report to identify the exact location of the lagoon. Additionally, Figures 1 and 2 present plan and cross sectional area views, respectively, of the lagoon. (These figures are revisions of Figures 1 and 2 of the closure plan (Reference 1) based on field data obtained during closure.)

As can be seen from Figure 1, the lagoon was oval in shape with dimensions of approximately 90 feet east-west, by 80 feet north-south. The western boundary of the lagoon was approximately 70 feet due east of the Well Road. There are several monitoring wells, upgradient (UL-2) and downgradient (DL-1 through DL-4) of the lagoon.

As shown on Figure 2, natural grade sloped steeply from approximately 303 feet above mean sea level (MSL) at the Well Road to about 275 feet above MSL at DL-3. Natural grade at the lagoon was about 280 feet above MSL. The historical, low seasonal water table is about 12 feet below grade in the general area of the lagoon.

The lagoon was constructed in 1963 by excavating to a uniform elevation and using the excavated soils to form a berm around the downhill sections. Through 1979, the lagoon was used for treatment (e.g., stabilization and dewatering) of sludges from the laboratory wastewater treatment system and from the sanitary wastewater treatment plant. The laboratory wastewater system was used to separate oils present in the laboratory wastewater. As a result, the sludge contained small amounts of hydrocarbons as well as small quantities of solvents. Sanitary wastewater treatment sludge contained trace amounts of ortho-dichlorobenzene (use of the primary source of this solvent has since been discontinued). Annual quantities of combined sludge sent to the lagoon were on the order of 75,000 gallons through 1979. From 1980 to June 1981, approximately 30,000 to 40,000 gallons of sanitary wastewater treatment sludge only were placed in the lagoon. Sludge has not been added to the lagoon since June 1981. When originally placed in the lagoon, the sludges are believed to have contained about 96 percent water; the remainder being mostly solids. Most of this water was lost over time, resulting in a significant reduction in sludge quantity.

In the closure plan, it was estimated that approximately 60,000 gallons (300 cubic yards) of sludge would be in the lagoon at closure; the difference between this estimate of sludge and the amount placed in the lagoon was attributed to loss of water over time.

3.0 SUMMARY OF CLOSURE PLAN

The closure plan called for the removal of the sludge and subsoil, backfilling with clean fill material, and grading to restore the approximate natural topography. The removal of the sludge and subsoil was to be carried out in a series of excavation lifts with each lift covering the entire surface of the lagoon to a depth of about 3 feet. All sludge residues and underlying and surrounding soil were to be removed subject to analytical and/or physical limitations.

At the completion of each lift, soil sampling and testing would be performed to determine if the analytical limitations were met. If analytical limitations were not achieved, excavation would continue until the physical limitations were reached. The physical limitations were established to define the maximum dimensions of the excavation.

The soil sampling and testing program at the completion of each lift involved taking both excavation bottom and wall soil samples and analyzing these for priority pollutant volatile organics and Extraction Procedure (EP) Toxicity for metals. Analytical methods for extraction and analysis were to be done in accordance with EPA Test Method Manual SW-846 approved procedures. These procedures would be performed to obtain the lowest possible detection limits for all organics as dictated by the soil sample matrix. In addition to the individual samples, a composite bottom sample would be analyzed for the parameters above as well as for priority pollutant base/neutral and acid extractable organics categories.

The excavation would terminate when the individual priority pollutant volatile organics were not detected in any individual sample and none of the samples exceeded EP toxicity limits for metals. If the above criteria were not met, the excavation would proceed through additional lifts until the physical limitations were reached. The maximum depth of the excavation would be the elevation of the historical low seasonal water table, approximately 12 feet below the natural grade surface.

The lateral extent of excavation was set in all directions at two feet beyond the outermost limit of the surface impoundment berms.

The plan called for the utilization of a site dewatering and drainage control system to reduce the infiltration of surface runoff into the excavation and to keep groundwater levels below the bottom of the excavation. All water collected from the site dewatering and drainage control system would be pumped to a storage pool and transported for disposal at an approved off-site hazardous waste treatment or disposal facility in accordance with all state and federal hazardous waste regulations.

The closure plan, as modified in November and December 1985, allowed for direct loading of trucks at the Well Road west of the lagoon. This direct loading eliminated the need for intermediate storage of excavated materials at a load out pad prior to loading trucks for removal of the materials from the site. As part of the direct loading approach, considerable care would be taken to keep all exterior portions of the trucks free and clean of excavated materials in order to avoid having to decontaminate the trucks. Specifically, plastic liner materials would have to be draped over the side of each truck and placed on the ground adjacent to the truck to keep the truck exterior clean and to capture all spilled materials. All such materials would then be encapsulated in the plastic liner and loaded on to the truck for disposal.

4.0 IMPLEMENTATION OF CLOSURE PLAN

4.1 INTRODUCTION

Implementation of the closure plan began on February 4, 1986 and was completed on March 21, 1986. The closure effort consisted of several major activities, as follows:

- o Initial Site Preparation
- o Excavation and Sludge/Soil Removal
- o Sampling and Analysis
- o Dewatering and Liquid Removal
- o Demobilization and Site Restoration

While each of these activities is described subsequently, it should be recognized that the activities are interrelated and were carried out, for the most part, concurrently. Consequently, the discussion of work carried out as part of any one activity will likely refer to or include information related to one or more of the other activities.

As an aid in the description of the closure activities, Table 4.1 presents, for each day during the closure, a summary of the activities that were conducted. During the 45 day period during which closure took place, trucks were loaded out with sludge and subsoil on 15 days. Work was hampered by bad weather and soft ground which required substantial road surface strengthening with gravel and stone in order for the road beds to be able to support the weight of the trucks. During the latter stages of the closure, all work, with the exception of dewatering, was suspended pending the completion of laboratory analyses. Laboratory analyses were completed on March 13. Final work activities, including backfilling, grading and a final topographic survey, were initiated on March 14 and completed during the week of March 16.

4.2 INITIAL SITE PREPARATION

Initial site preparation began on February 4, 1986 and continued for about one week. In anticipation of closure, Texaco had the trees cleared from the area near the lagoon in August of 1985. One of the first tasks carried out in February involved strengthening the access roads to the site. These were dirt roads that were extremely soft and incapable of supporting the heavy truck loads that were anticipated. Consequently, stone and gravel were spread over the road surfaces in order to create firm road beds. As was indicated previously, it was necessary for this procedure to be repeated many times during the course of the closure in order to maintain the access roads in suitable condition.

TABLE 4.1

HAZARDOUS WASTE SLUDGE LAGOON

SUMMARY OF DAILY ACTIVITIES

DATE	ACTIVITIES
2/4	- fortification of access roads with gravel - start of construction of the 12,000-gallon storage pool
2/5	- completed construction of storage pool - sludge stabilization by mixing with kiln dust
2/6	- start of lagoon dewatering
2/7	- lagoon dewatering
2/8	- no work performed (bad weather)
2/9	- no work performed (Sunday)
2/10	- sludge stabilization - fortification of access roads
2/11	- no work performed (bad weather)
2/12	- sludge stabilization - 2 truck loads of sludge/soil removed
2/13	- 8 truck loads of sludge/soil removed
2/14	- sludge stabilization - 8 truck loads of sludge/soil removed
2/15	- sludge stabilization - 7 truck loads of sludge/soil removed
2/16	- no work performed (Sunday)

TABLE 4.1 (Continued)

DATE	ACTIVITIES
2/17	- 7 truck loads of sludge/soil removed
2/18	- lagoon dewatering
2/19	- 12 truck loads of sludge/soil removed
2/20	- lagoon dewatering
2/21	- fortification of access roads - lagoon dewatering
2/22	- tanker (5,000-gallon capacity) of liquid removed - fortification of access roads
2/23	- no work performed (Sunday)
2/24	- fortification of access roads - lagoon dewatering
2/25	- fortification of access roads - 6 truck loads of sludge/soil removed
2/26	- fortification of access roads - 1 truck load of sludge/soil removed - lagoon sampling - tanker of liquid removed
2/27	- fortification of access roads - topographic survey of lagoon - sludge stabilization - 3 truck loads of sludge/soil removed
2/28	- tanker of liquid removed
3/1	- 4 trucks loads of sludge/soil removed - tanker of liquid removed
3/2	- no work performed (Sunday)
3/3	- tanker of liquid removed - lagoon sampling

TABLE 4.1 (Continued)

DATE	ACTIVITIES
3/4	- no work performed pending results of laboratory screening analyses
3/5	- lagoon dewatering - 2 truck loads of sludge/soil removed - lagoon certification sampling - tanker of liquid removed
3/6	- 6 trucks loads of sludge/soil removed - lagoon certification sampling
3/7	- topographic survey of lagoon - 1 truck load of sludge/soil removed
3/8	- no work performed pending results of laboratory certification analyses
3/9	- tanker of liquid removed - awaiting results of laboratory certification analyses
3/10	- lagoon dewatering - tanker of liquid removed - awaiting results of laboratory certification analyses
3/11	- lagoon dewatering - tanker of liquid removed - awaiting results of laboratory certification analyses
3/12	- awaiting results of laboratory certification analyses
3/13	- laboratory certification analyses completed - all analytical closure limitations achieved
3/14	- tanker of liquid removed - start of lagoon backfilling
3/15	- lagoon backfilling

TABLE 4.1 (Continued)

3/16	- lagoon backfilling
3/17	- 2 truck loads of sludge and soil debris from the 12,000 gallon pool removed
3/18	- 1 truck load containing pool liner, sludge debris, soil scrapings and culvert pipe removed
3/19	- backfill and rough grading
3/20	- backfill and rough grading
3/21	- topographic survey
6/22	- final grading
6/23	- seeding

As part of the site preparation and to support dewatering activities, a 12,000 gallon pool was set up northwest of the lagoon. The pool was staged above ground on a platform composed of sand and stone. The pool was constructed with circular metal walls and a double synthetic liner.

Once the storage pool was completed, dewatering activities were initiated. This required breaking through the snow and ice cover of the lagoon surface and excavating a sump into the lagoon. The snow and ice removed from the lagoon surface was deposited in the storage pool for ultimate disposal. Liquid pumped from the lagoon sump was also stored in the pool. While groundwater levels were below the bottom of the excavation during the closure, it was necessary to continue dewatering because of the continuing infiltration into the lagoon of surface runoff. While this infiltration was somewhat abated by the excavation of a deep trench around the western and southern boundaries of the lagoon to divert runoff around the lagoon, the infiltration was still sufficient to require dewatering.

Reflecting the impact of this surface infiltration, the sludge itself was extremely moist. Consequently, in order to make the sludge suitable for handling and acceptable at the approved off-site hazardous waste disposal facility, it was necessary to stabilize the sludge by mixing it with kiln dust. The kiln dust was discharged into the lagoon and mixed with the sludge by a trackhoe. The kiln dust was provided by an offsite supplier. This process was repeated many times during the closure in order to maintain the sludge and subsoil in satisfactory condition for transportation and disposal.

4.3 EXCAVATION AND SLUDGE/SOIL REMOVAL

The excavation and sludge/soil removal process involved the utilization of a trackhoe excavator and loader to excavate and transport the sludge/soil from the lagoon to trucks. The trackhoe performed the excavation and either directly transferred the excavated material to the loader or staged the material (on a polyethylene sheeting liner) for later removal by the loader. The loader transported the material to the trucks which were staged on the Well Road immediately upgradient and west of the excavation site (see Figure 1). In addition to the normal plastic liner these trucks carry in their beds, liners were draped over the outside of each truck on the side being loaded and on the ground adjacent to the truck so that the front of the loader was on the plastic during loading. This liner was, in effect, in a position to catch and contain any spillage of sludge/soil that might occur while loading. If spillage occurred, the liner was manually picked up and

placed into the truck along with any spillage it contained. Moreover, if there was any spillage of material from the loader during transport from the lagoon to the trucks the spilled material was collected and placed into the trucks. Any liners that came in contact with spilled lagoon material during the loading process or liners that became ripped or torn, were picked up and placed into a truck being loaded.

All materials removed from the site by this procedure were transported to Fondessy Enterprises Inc., Oregon, Ohio, for ultimate disposal. Fondessy Enterprises Inc. operates an approved hazardous waste disposal facility, (EPA I.D. No. OHD045243706). Dart Trucking Inc. (EPA I.D. No. OHD009865825) and Jack Gray Inc. (EPA I.D. No. IND042534875), approved hazardous waste haulers, transported the sludge and soil to Fondessy.

Utilizing the above procedure, the first two truck loads were removed from the site on February 12. Overall, a total of 70 truck loads of material representing 1,747.09 tons were removed. The last truck load left the site on March 18. Table 4.2 presents a daily summary of the number of truck loads and weight of material removed. Table 4.3 lists, for each individual truck load, the manifest number and weight.

A topographic survey (Figure 3) was performed on March 7 after 67 truck loads and 1,671.15 tons of material had been removed. The topography at the time of this survey represents site conditions at the time of the sampling program of March 5 and 6 , which determined that the site was free of contamination and that excavation could cease. A cross-sectional view of the lagoon topography on March 7 is presented on Figure 2. A final survey (Figure 4) was conducted on March 21, after the site had been backfilled and graded.

4.4 SAMPLING AND ANALYSIS

4.4.1 Preliminary Screening

Prior to February 26, some 50 truck loads, containing close to 1300 tons of sludge, soil and kiln dust, had been removed from the site. This was well in excess of what was anticipated in the DEC approved closure plan (Reference 1) for the first lift (i.e., 50 feet by 65 feet to a depth of about 3 feet). (Moreover, this was very close to what was considered in the closure plan to be the maximum quantity of materials (i.e., 1500 tons) that would have to be removed in the event that the physical limitations controlled.) In effect, the excavation had proceeded on the basis of visual criteria (that is, excavating what appeared to be sludge and stained soil) and as a result, a more substantial excavation

TABLE 4.2

HAZARDOUS WASTE SLUDGE LAGOON

DAILY SUMMARY OF

TRUCKS LOADS OF SLUDGE AND SUBSOIL

REMOVED FROM THE SITE AND DISPOSED OF

AT FONDESSY ENTERPRISES INC., OREGON, OHIO

(EPA I.D. NO. OHD045243706)

REMOVAL DATE	NUMBER OF TRUCK LOADS	TOTAL WEIGHT (TONS)	CUMULATIVE WEIGHT (TONS)
2/12	2	48.49	48.49
2/13	8	175.98	224.47
2/14	8	173.29	397.76
2/15	7	170.56	568.32
2/17	7	208.05	776.37
2/19	12	348.31	1124.68
2/25	6	146.71	1271.39
2/26	1	20.91	1292.30
2/27	3	59.64	1351.94
3/1	4	88.03	1439.97
3/5	2	62.41	1502.38
3/6	6	142.79	1645.17
3/7	1	25.98	1671.15
3/17	2	51.55	1722.70
3/18	1	24.39	1747.09
2/12 - 3/18 TOTAL	70	1,747.09	

TABLE 4.3

HAZARDOUS WASTE SLUDGE LAGOON

TRUCK LOADS OF SLUDGE AND SUBSOIL

REMOVED FORM THE SITE AND DISPOSED OF

AT FONDESSY ENTERPRISES INC., OREGON, OHIO

(EPA I.D. NO. OHD045243706)

	REMOVAL DATE	LOAD NO.	STATE MANIFEST NO.	WEIGHT (TONS)
	2/12	1	NYA 3460138	24.93
		2	NYA 3460140	23.56
2/12	SUBTOTAL			48.49
	2/13	3	NYA 3460206	20.35
		4	NYA 3460217	20.16
		5	NYA 3460228	22.92
		6	NYA 3460230	22.55
		7	NYA 3460241	22.87
		8	NYA 3460252	20.15
		9	NYA 3460263	23.11
		10	NYA 3460274	23.87
2/13	SUBTOTAL			175.98
	2/14	11	NYA 3460285	21.08
		12	NYA 3460296	21.12
		13	NYA 3460307	23.49
		14	NYA 3460318	21.81
		15	NYA 3460320	20.25
		16	NYA 3460151	22.29
		17	NYA 3460162	21.20
		18	NYA 3460173	22.05
2/14	SUBTOTAL			173.29
	2/15	19	NYA 3460184	25.63
		20	NYA 3460195	24.64
		21	NYA 3436053	24.11
		22	NYA 3436064	22.35
		23	NYA 3436075	24.30
		24	NYA 3436086	24.96
		25	NYA 3436097	24.57
2/15	SUBTOTAL			170.56

TABLE 4.3 (CONTINUED)

REMOVAL DATE	LOAD NO.	STATE MANIFEST NO	WEIGHT (TONS)
2/17	26	NYA 3436108	30.65
	27	NYA 3436110	27.48
	28	NYA 3436121	30.38
	29	NYA 3436132	29.13
	30	NYA 3436143	30.38
	31	NYA 3436154	28.77
	32	NYA 3436165	31.26
2/17 SUBTOTAL			208.05
2/19	33	NYA 3436176	29.41
	34	NYA 3436187	30.32
	35	NYA 3436198	29.22
	36	NYA 3460061	27.07
	37	NYA 3460072	27.07
	38	NYA 3460083	29.54
	39	NYA 3460094	30.31
	40	NYA 3436200	27.43
	41	NYA 3436211	28.53
	42	NYA 3436222	29.35
	43	NYA 3436233	29.13
	44	NYA 3436244	30.93
2/19 SUBTOTAL			348.31
2/25	45	NYA 3436255	21.97
	46	NYA 3436266	25.64
	47	NYA 3436277	25.58
	48	NYA 3436288	23.55
	49	NYA 3436290	24.65
	50	NYA 3436301	25.32
2/25 SUBTOTAL			146.71
2/26	51	NYA 3436312	20.91
2/27	52	NYA 3436323	20.15
	53	NYA 3436334	17.06
	54	NYA 3436345	22.43
2/27 SUBTOTAL			59.64
3/1	55	NYA 3436356	23.06
	56	NYA 3436367	23.72
	57	NYA 3436378	21.77
	58	NYA 3436380	19.48
3/1 SUBTOTAL			88.03

TABLE 4.3 (CONTINUED)

REMOVAL DATE	LOAD NO.	STATE MANIFEST NO.	WEIGHT (TONS)
3/5	59	NYA 3491640	32.90
	60	NYA 3491638	29.51
3/5 SUBTOTAL			62.41
3/6	61	NYA 3491627	24.70
	62	NYA 3491616	23.20
	63	NYA 3491605	22.15
	64	NYA 3491594	23.36
	65	NYA 3436042	26.33
	66	NYA 3491651	23.05
3/6 SUBTOTAL			142.79
3/7	67	NYA 3491662	25.98
3/17	68	NYA 3491684	24.35
	69	NYA 3491695	27.20
3/17 SUBTOTAL			51.55
3/18	70	NYA 3491706*	24.39
OVERALL TOTAL (2/12 - 3/18)			1,747.09

* Included Pool Liner and Culvert Pipe

had taken place as part of this so called "first lift". There was some concern on the part of Texaco project personnel that some of the material considered stained soil was naturally occurring grey till which underlies the brown till in the area of the lagoon.

On February 26, because of an improved appearance within the excavated area, the considerable excavation that had already taken place and the question being raised over what was stained soil or grey till, it was decided to immediately sample the site on that day. This first round of sampling consisted of 5 bottom and 2 wall soil samples and 1 sample of ponded liquid from a small pool near the center of the excavation. These samples were screened for priority pollutant volatile organics by EnviroTest Laboratories Inc. (ETL) of Newburgh, New York (a New York State certified laboratory for hazardous waste analysis) and by TRCB's laboratory. The results of this screening showed a some of the samples to have detectable levels of priority pollutant volatile organics including the sample of the ponded water in the center of the excavation.

Late in the day on February 27, after additional excavation and dewatering in areas having detectable levels of volatile organics, based on the February 26 samples, a second round of sampling was undertaken. This second round consisted of 2 bottom and 1 wall soil samples, which were also screened by ETL and TRCB for priority pollutant volatile organics. The results of this screening continued to show the detectable presence of volatile organics.

In view of the results of the sampling programs of February 26 and 27 and in order to provide insight as to the extent of additonal excavation that might be required, split spoon samples of the bottom of the excavation to a depth of about 1.5 feet were taken on March 3. The results of this screening indicated that only limited additional excavation would be required. Consequently, additional excavation took place during March 3 through 5 and a final certification sampling program, consistent with the requirements of the closure plan, was conducted on March 5 and 6.

4.4.2 Certification Sampling Program - March 5 and 6, 1986

By March 5, 60 truck loads containing 1,502.38 tons of sludge, soil and kiln dust had been removed from the site and disposed of at Fondessy Enterprises Inc. in Oregon, Ohio (an approved hazardous waste disposal facility-EPA I.D. No. OHD045243706). An additional 168.77 tons of material, representing 7 truck loads, had been excavated and was staged at the site ready for load out to Fondessy. Thus, a total of 1,671.15 tons of sludge, soil and kiln dust had been

excavated from the lagoon. This was well in excess of the approximate 300 tons (300 yards) of sludge which were estimated in the closure plan to be in the lagoon.

Locations of the samples taken on March 5 and 6 are presented on Figure 3. The March 5 samples were taken at the following locations:

- The bottom center of the lagoon, which measured approximately 45 ft. from the east and west boundaries and approximately 40 ft from the south and north boundaries. This sample is identified as BC3 (Bottom Center - third round).

- The bottom at distances of approximately 20 ft. north and 20 ft. south of the center. These samples are identified as BN3 (Bottom North - third round) and BS3 (Bottom South-third round), respectively.

- The bottom at a distance of approximately 22.5 ft. east of the center. This sample is identified as BE3 (Bottom East - third round).

On March 6, the following samples were taken:

- The bottom at a distance of approximately 22.5 ft. west of the center. This sample is identified as BW4 (Bottom West - fourth round).

- Composite samples at three separate locations along each of the south wall (SW4, South Wall - fourth round), the west wall (WW4, West wall - fourth round) and the north wall (PB4, Pile Berm - fourth round [1]). The eastern boundary was essentially at grade and a wall sample could not be obtained.

The sampling logs on March 5 and 6 are summarized on Tables 4.4 and 4.5. All laboratory analyses were performed by ETL. The ETL report, presenting the results of the laboratory analyses and demonstrating compliance with the requirements of the closure plan, is presented as an Appendix to this report. In addition, the ETL analytical results are summarized in Tables 4.6, 4.7 and 4.8. Table 4.6 presents the results of analyses for priority pollutant volatile organics for each of the samples and for a composite made up

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[1] The North Wall had been characterized as Pile Berm in earlier sampling rounds because excavated materials were at times staged atop this wall prior to being loaded out.

TABLE 4.4

SAMPLING LOG
MARCH 5, 1986

STARTING TIME: 1:00 PM
INDIVIDUALS PRESENT: M. Strayer, R. Warren and M. Ericson, O.H. Materials Co.; R. Scully, Texaco; John L. Leporati, P.E.

BACKGROUND PID: 0.4 ppm

Sample ID.	Time	PID	Sample Appearance
BE3	1:15	0.4	Brown, dry
BS3	1:20	3.2	Grey, green, moist
BC3	1:25	2.0	Grey, green, moist
BN3	1:30	1.4	Brown, dry

SAMPLE PREPARATION: 1:35 - 2:00 p.m.

ENDING TIME: 2:00 p.m.

TABLE 4.5

SAMPLING LOG
MARCH 6, 1986

STARTING TIME: 11:55 a.m.
INDIVIDUALS PRESENT: M. Strayer, O.H. Materials Co.;
R. Scully, Texaco;
John L. Leporati, P.E.

BACKGROUND PID: 0.6 ppm

Sample ID	Time	PID	Sample Appearance
BW4	12:00	1.2	Grey moist
SW4*	12:05	0.6	Grey and brown, slightly moist
PB4*	12:20	0.6	Dry brown
WW4*	12:25	1.0	Dry brown

* Composite of three locations along wall

SAMPLE PREPARATION: 12:30 - 1:00 p.m.

ENDING TIME: 1:00 p.m.

TABLE 4.6

CERTIFICATION SAMPLING PROGRAM OF MARCH 5 AND 6, 1986
VOLATILE ORGANICS ANALYTICAL RESULTS
BOTTOM, WALL AND BOTTOM COMPOSITE SAMPLES

The concentrations of the following Volatile Organics were below method detection limits in all samples:

Acrolein
Acrylonitrile
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon tetrachloride
Chlorobenzene
Chloroethane
2-Chloroethylvinyl ether
Chloroform
Chloromethane
Cis-1,3-dichloropropene
Dibromochloromethane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,1-Dichloroethene
1,2-Dichloroethane
1,1-Dichloroethane
1,2-Dichloropropane
Ethylbenzene
Methylene chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
trans-1,3-Dichloropeopene
trans-1,2-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichlorofluoromethane
Vinyl chloride
m-Xylene
p,p-Xylene

TABLE 4.7

CERTIFICATION SAMPLING PROGRAM OF MARCH 5 AND 6, 1986
EP TOXICITY ANALYTICAL RESULTS
BOTTOM, WALL AND BOTTOM COPOSITE SAMPLES

The concentrations of the EP Toxicity Metals were as follows for all samples:

Compounds	Concentration (ug/l)
As	<5
Ba	<0.2
Cd	<0.01
Cr	<0.05
Pb	<0.05
Hg	<0.4
Se	<2
Ag	<0.01

TABLE 4.8

CERTIFICATION SAMPLING PROGRAM OF MARCH 5 AND 6, 1986
BASE NEUTRAL EXTRACTABLES AND
PESTICIDE/PCB ANALYTICAL RESULTS
BOTTOM COMPOSITE SAMPLE

(1) Base Neutral Extractables

The concentrations of the following Base Neutral Extractables were below method detection limits:

Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo (a) Anthracene
Benzo (a) Pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) Perylene
Benzo (k) Fluoranthene
Bis (2-Chloroethyoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-Ethylhexyl) phthalate
4 Bromophenylphenylether
Butyl Benzyl Phthalate
2-Chloronaphthalene
4-Chlorophenylphenylether
Chrysene
Dibenzo (a,h) Anthracene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
Diethyl Phthalate
Dimethyl Phthalate
Di-N-Butyl Phtahalate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-N-Octyl Phthalate
1,2-Diphenylhydrazine
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3-cd) Pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitrosodimethylamine
N-Nitrosodi-n-Propylene
N-Nitrosodiphenylamine
Phenanthrene
Pyrene
1,2,4-Trichlorobenzene

(2) Pesticide/PCB

The concentrations of the following Pesticides/PCBs were below method detection limits:

Aldrin
Alpha-BHC
Beta-BHC
Gamma-BHC
Delta BHC
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
Dieldrin
Alpha-Endosulfan
Beta-Endosulfan
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016
Toxaphene

of the bottom samples only. Similarly, Table 4.7 presents the results of analyses for Extraction Procedure (EP) Toxicity for metals for each of the samples as well as for the composite made up of the bottom samples. Table 4.8 presents the results of the analyses of the bottom composite sample for base/neutral extractables and pesticide/PCBs.

4.5 DEWATERING AND LIQUID REMOVAL

Site dewatering was a continuing activity which began at the very outset of work at the site and continued through the last week of activity. As indicated previously, during initial site preparation activities, a 12,000 gallon storage pool was set up northwest of the lagoon and just east of Well Road. This pool was used to store liquid produced by site dewatering and equipment decontamination, prior to transportation to an approved hazardous waste disposal facility.

At the outset of work, the snow and ice cover of the lagoon was removed and deposited in the storage pool. The ice cover was as much as 3 inches thick over much of the surface resulting in the storage of large pieces of ice in the storage pool. After breaking through the ice and removing the ice cover, standing water from the lagoon surface was pumped directly into the storage pool. A sump was then excavated in the northeast corner of the lagoon to remove water infiltrating into the lagoon and to keep groundwater levels below the bottom of the excavation.

As work continued, it became clear that any water entering the lagoon was the result of surface infiltration. Groundwater level measurements at wells UL-2 and DL-3 were 8 to 9 feet below grade prior to excavation and 6 to 8 feet below grade just prior to backfilling. Since excavation at the lagoon was, at most, 5 ft. below natural grade, it is likely the excavation did not enter the groundwater table.

On the other hand, infiltration of surface water was clearly visible. Numerous streams of surface water could be seen entering the excavation through the western (upgradient) wall. Consequently, two actions were taken to mitigate this problem. First, a deep trench was excavated around the western and southern boundaries of the lagoon in order to divert runoff around the lagoon. While this resulted in a significant reduction in surface infiltration, it did not totally eliminate it.

It was then decided to excavate a second sump in the western portion of the lagoon, in the immediate vicinity of the infiltration streams. Liquid from this sump was then

pumped directly to the storage pool. By this combination of techniques, water within the lagoon was maintained at levels which allowed the excavation work to proceed.

As was stated previously, the 12,000 gallon pool was used to store decontamination wash water prior to removal for offsite disposal. Clean water for decontamination purposes was trucked to the site in drums and contained in drums and pails where it was used to wash boots and other equipment used at the site. The wash water produced was then manually deposited into the storage pool.

All liquid produced through dewatering and decontamination was disposed of at an approved liquid hazardous waste disposal facility in Deepwater, New Jersey operated by DuPont (EPA ID No. NJD002385730). The liquid was transported to Dupont's Deepwater facility in 5,000-gallon capacity tanker trucks operated by Continental Vanguard (EPA I.D. No. NJD067385514) and SJ Transportation (EPA I.D. No. NJD071629976), approved liquid hazardous waste haulers. Table 4.9 lists the date, manifest number and hauler for each of the tanker truck loads removed from the site.

4.6 DEMOBILIZATION AND SITE RESTORATION

Demobilization involved the reassignment of project personnel and the dismantling, decontamination and removal of all project equipment and facilities. Site restoration involved (1) grading the areas that had been excavated in order to restore the prior natural contour of the land and provide for effective surface runoff and (2) hydroseeding the excavated areas to establish a vegetative cover and to prevent erosion.

The demobilization and site restoration phase was initiated on March 14, 1986 following the completion of the ETL analyses of the March 5 and 6 samples. On March 14, backfilling operations began. At first, the bottom of the lagoon was filled with tree stumps and brush from around the lagoon. Backfill soil was obtained by excavating from the elevated areas north and south of the lagoon. This fill material was backdragged into the lagoon and then rough graded to create a gradual sloping of the terrain proceeding from west to east. The resulting contours were considered to be reasonably similar to the natural contours in that general area. Figure 4 presents the results of the topographic survey conducted on March 21, 1986 after the completion of backfilling and rough grading.

TABLE 4.9

HAZARDOUS WASTE SLUDGE LAGOON

LIQUID REMOVED FROM THE SITE

AND DISPOSED OF AT DUPONT INC.'s

DEEPWATER, NEW JERSEY, DISPOSAL FACILITY

(EPA I.D. NO. NJD002385730)

Date	Tanker Load	State Manifest	Transporter
2/22	1	NJA0130391	Continental Vanguard
2/26	2	NJA0130392	Continental Vanguard
2/28	3	NJA0130395	S-J Transportation
3/1	4	NJA0130394	Continental Vanguard
3/3	5	NJA0130393	S-J Transportation
3/5	6	NJA0130396	Continental Vanguard
3/9	7	NJA0177878	Continental Vanguard
3/10	8	NJA0177880	S-J Transportation
3/11	9	NJA0177879	Continental Vanguard
3/14	10	NJA0177882	Continental Vanguard

On March 14, the 12,000 gallon storage pool was dewatered and shipped in the last tanker truck load for disposal at Dupont's Chambers works in Deepwater, New Jersey. Following the dewatering of the storage pool, the residual sludge in the pool was stabilized by mixing with kiln dust and soil scraped from the surface of the work areas adjacent to the excavation site.

Polyethylene sheeting, which had been used during site operations as a separation liner between any staged excavated materials and the clean ground surface, had also been deposited in the storage pool. The contents of the storage pool, the pool liner and scrapings from the sand bed that had been placed below the pool were loaded onto three trucks (two on March 17 and one on March 18) for shipment to the Fondessy disposal facility. The culvert pipe which was used for depositing sludge into the lagoon was excavated on March 18 and directly loaded on to the last truck load. Also, the residual materials produced from the decontamination of the equipment used to handle the material contained in the last three truck loads was also, directly deposited into the last truck load (March 18).

The demobilization of personnel and equipment took place throughout the week of March 17. The last group of personnel and pieces of equipment departed the site on March 21.

With respect to site restoration, as was indicated earlier, rough grading was performed as part of the backfilling of the site. Final grading and hydroseeding of the site were performed, respectively, by Sunup Enterprises Inc. and Old Oak Landscaping Inc. on June 23, 1986.

5.0 POST CLOSURE ACTIONS

At the request of the New York State Department of Environmental Conservation (Reference 5), Texaco will submit a post closure plan in accordance with 6 NYCRR Part 373 by February 1, 1987. In the interim, Texaco has undertaken a groundwater monitoring program at Well DL 3 in accordance with Section VI of the closure plan (Reference 1) which calls for quarterly monitoring for priority pollutant volatile organics for a period of one year after closure.

One month after completion of the last quarterly analysis, Texaco will submit a well DL-3 groundwater monitoring assessment report presenting Texaco's conclusions and recommendations.

6.0 CERTIFICATION

The closure of the hazardous waste lagoon at the Texaco Research Center, Beacon, New York, Facility EPA Identification No. NYD091894899, was conducted from early February 1986 to late March 1986. I, John L. Leporati, a registered professional engineer in New York State, was present during the course of the closure of the lagoon and, hereby, certify that the lagoon was closed in accordance with the closure plan as approved by the New York State Department of Environmental Conservation.

John L. Leporati
New York State
Professional Engineer License No. 47204

Date
July 15, 1986