REDACTED VERSION

EXPANDED SITE INSPECTION REPORT

WILCOX OIL COMPANY
BRISTOW, CREEK COUNTY, OK
EPA CERCLA I.D. NO.: OKD001010917

5615765

Prepared for

U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

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March 1997

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WILCOX OIL COMPANY
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March 1997

SIGNATURE PAGE

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Lon Biasco
U.S. Environmental Protection Agency
Work Assignment Manager

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EXPANDED SITE INSPECTION REPORT

WILCOX OIL COMPANY
BRISTOW, CREEK COUNTY, OK
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SECTION 1
INTRODUCTION

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1.1 BACKGROUND

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the 1986 Superfund Amendments and Reauthorization Act (SARA), Roy F. Weston, Inc. (WESTON®) has completed an Expanded Site Inspection (ESI) of the Wilcox Oil Company (Wilcox) site (EPA Identification No.: OKD001010917) located in Bristow, Creek County, Oklahoma (Figure 1-1). The U.S. Environmental Protection Agency (EPA) Region 6 retained WESTON to complete this investigation under EPA Contract No. 68-W9-0015 and Work Assignment No. 56-6JZZ.

This document represents the final report for the ESI. The purpose of this report is to provide the background information collected for the site, to discuss the ESI sampling activities, and to present the analytical data obtained as part of the investigation.

1.2 OBJECTIVES OF THE INVESTIGATION

The ESI is intended to be the final investigation in an ongoing screening process of known and potential hazardous waste sites. The general purpose of an ESI is to identify immediate or potential threats that hazardous substances attributable to the site may pose to human health and the environment by documenting the existence and migration of hazardous substances related to the site and by identifying the receptors, or targets, potentially exposed to the hazardous substances. The specific purpose of this ESI was to perform a reasonable effort characterizing sources of CERCLA-eligible hazardous substances at the site and evaluating whether a release to surface water has occurred.

EPA will use the information obtained during the ESI to evaluate the site using the Hazard Ranking System (HRS) and to help decide if the site is a potential candidate for inclusion on the National Priorities List (NPL). The intent of the ESI is to provide the documentation necessary to either rank a site on the NPL or to assign a "No Further Remedial Action Planned" (NFRAP) status.

1.3 SCOPE OF WORK

The ESI Scope of Work was centered on characterizing the site through the completion of limited site-related research, a site reconnaissance, and focused sampling activities. As part of this ESI, WESTON performed the following major tasks:

- An on-site reconnaissance was performed on 16 August 1996 to document current site conditions and to identify potential sources of hazardous substances at the site. WESTON performed the reconnaissance in general accordance with WESTON's Generic Site Inspection Work Plan (Document Control No. 4603-23-0008, dated 15 August 1991), the site-specific Health and Safety Plan (HASP) prepared by

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WESTON for the ESI, and the EPA Guidance for Performing Site Inspections under CERCLA, dated September 1992. During the site reconnaissance, two WESTON personnel visited the site, walked around the property, recorded observations in a logbook, and took photographs (Appendix A) to document site conditions. As part of the reconnaissance, a survey of the site's vicinity was completed to identify potential receptors, or targets, of hazardous substance migration and exposure attributable to the site. Nearby land use and potential alternative source sites were also documented.

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- A site-specific Task Work Plan (TWP) was prepared to provide a detailed plan of action for subsequent ESI activities.

- Information concerning the environmental setting of the site was obtained to describe the groundwater, surface water, soil exposure, and air pathways.

- Available regulatory compliance files from federal, state, and local government agencies were reviewed, and telephone interviews were conducted with authorities knowledgeable of the site and its surroundings.

- WESTON field personnel performed sampling tasks from 18 through 20 November 1996. Samples were collected in known or suspected source areas at the site and in the suspected pathways of contaminant migration and exposure. The samples were collected in general accordance with the site-specific TWP and HASP to document the presence and migration of hazardous substances attributable to the site.

- Available information from on-site observations, records review, interviews, site area environmental and demographic characteristics, and historical sample analyses were evaluated.

- The ESI samples were sent to EPA-designated laboratories for analysis, and the resulting data were reviewed and tabulated.

- This report was prepared to present the findings of the ESI.

1.4 REPORT FORMAT

The ESI Report is presented in a format that is intended to facilitate evaluation of the site using the HRS. The report contains the following sections:

- Section 1—Introduction
- Section 2—Site Characteristics
- Section 3—Sample Collection and Analysis
- Section 4—Source Characterization
- Section 5—Groundwater Pathway
- Section 6—Surface Water Pathway

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- Section 7—Soil Exposure
- Section 8—Air Pathway
- Section 9—Conclusions
- Section 10—References

Additional information is provided in the appendices following the text of the report. The appendices are as follows:

- Appendix A—Photographs
- Appendix B—Data Package Excerpts
- Appendix C—Analytical Results Summary
- Appendix D—CRQLs and CRDLs
- Appendix E—References

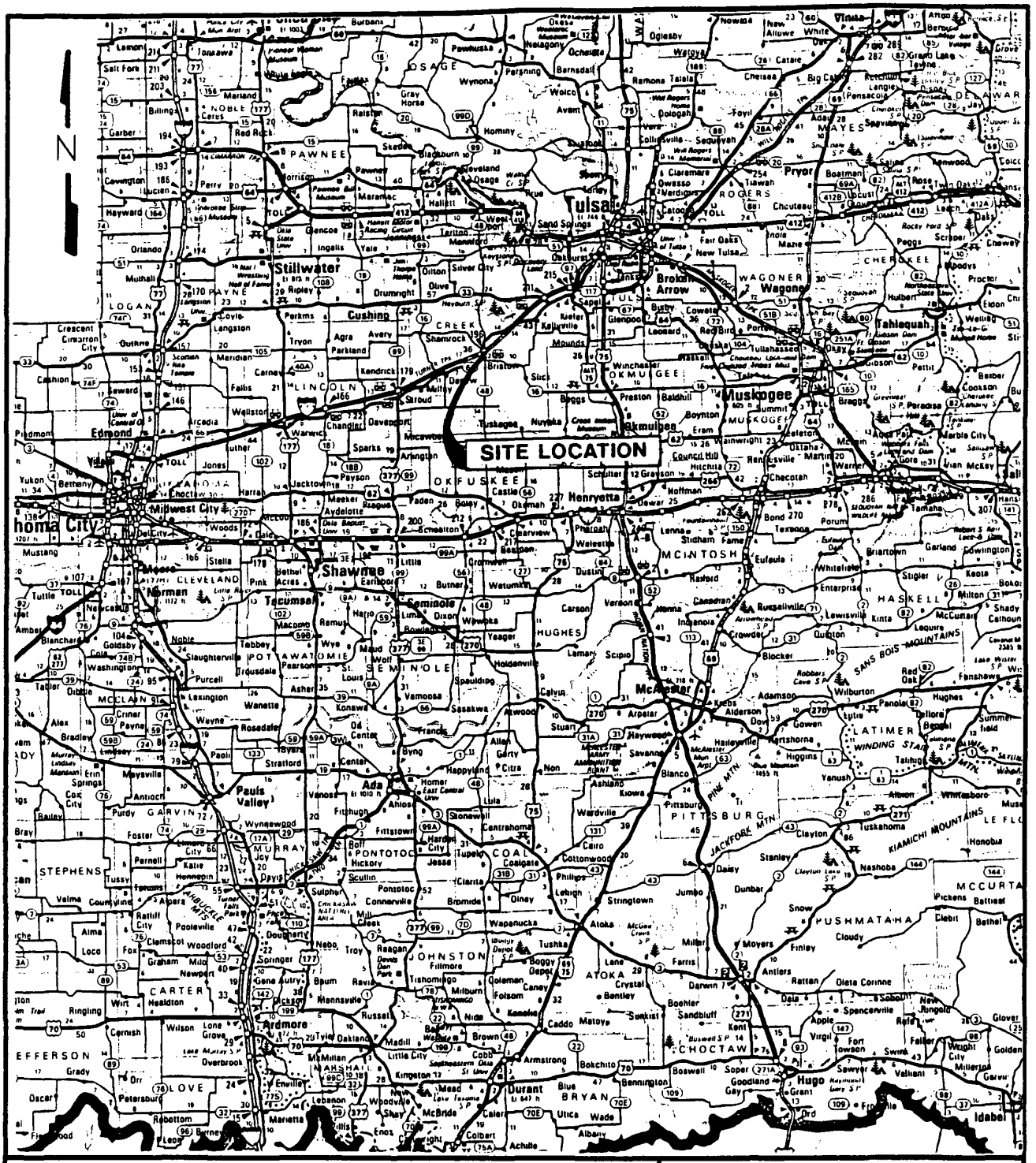
The figures and tables referred to throughout sections of this report are provided following the text of each section.

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MAP PREPARED FROM
RAND McNALLY ROAD ATLAS
OKLAHOMA
1990 EDITION

0 15 30

APPROXIMATE SCALE IN MILES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

FIGURE 1-1
SITE LOCATION MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

SECTION 2
SITE CHARACTERISTICS

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WESTON collected and reviewed available background information regarding the location, description, operational history, and regulatory compliance of the site. The discussion in this section of the report is based on this background information, which is referenced throughout the text.

2.1 SITE DESCRIPTION AND BACKGROUND INFORMATION

The following characteristics of the site are summarized in this section of the report:

- Site Location
- Site Ownership
- Site Description
- Site Operational History
- Previous Investigations
- Nearby Land Use

2.1.1 Site Location

The site location was identified based on information provided in the Preliminary Assessment (PA) and observations made during the site reconnaissance (References 1 and 2). The Wilcox site includes an abandoned and demolished oil refinery and associated tank farm and is located north of Bristow, Creek County, Oklahoma. The site can be reached by traveling southwest on Interstate 44 (I-44) from Tulsa, Oklahoma, for approximately 35 miles. Exit State Highway 66 and continue south, approximately 0.5 mile to an unnamed section line road. Turn left on the section line road and travel approximately 0.2 mile east until you reach the site (References 1 and 2). The geographic coordinates of the site are approximately 35°50'31" North latitude and 96°23'02" West longitude (Reference 1). A Site Area Map derived from a U.S. Geological Survey (USGS) 7.5-minute topographic map is provided as Figure 2-1 (Reference 3).

2.1.2 Site Ownership

Based on EPA file information, the site is currently owned by four individuals: (b) (6) (b) (6) (father and son), and (b) (6) (b) (6) own most of the property that contains the original refining facility (Reference 1). The (b) own most of *the tank farm area (approximately 80 acres), which is currently not in use. The* (b) *own property* located in the south central portion of the site on the eastern edge of the (b) (6) property (and former refining facility).

Access agreements were obtained from all parties prior to ESI sampling activities with the exception of (b) (6) Access to the (b) property was obtained from (b) (6) in the field (Reference 2). Copies of the signed access agreements are included in Reference 4.

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2.1.3 Site Description

The Wilcox site includes remnants of an inactive oil refinery and associated tank farm. Based on recent conversations with the Oklahoma Department of Environmental Quality (ODEQ), the site boundaries have been revised from those defined in the 1994 PA to include only those areas in which Wilcox Oil Company conducted operations (Reference 5). Although Wilcox Oil Company owned property west of the railroad tracks (currently occupied by the First Assembly of God Church and pastor's residence), the facility only operated on the properties to the east of the tracks. Other refineries operated on the west side of the railroad tracks. The revised site covers approximately 98 acres and includes the northern portions of Section 29, Township 16 North, Range 9 East (Indian Meridian) (Reference 1 and 5).

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The site can be divided into two major former operational areas: the refinery and the tank farm. The former refinery area is fenced and covers approximately 18 acres (Reference 1). Most of the refinery structures and tanks have been removed or are in ruins. Four aboveground storage tanks (12,500 gallons each) remain standing, in addition to a number of discarded drums and pieces of scrap iron. A bare, unvegetated area is located in the southcentral portion of the refinery. A building in the northern part of the former refinery has been converted to a residence. An intermittent creek (Tributary 1) flows southward across the eastern portion of the refinery area through a small pond in the southeast corner of the refinery area into Sand Creek.

The former tank farm covers approximately 80 acres and contains pits, ponds, and a number of circular berms that surround tank bottoms. All of the tanks have been cut down and removed; however, remnants of the tank bottoms remain and are visible. Many of the berms surrounding the pits, ponds, and former tanks have been cut or leveled. An intermittent creek (Tributary 2) is located in the eastern portion of the tank farm and flows south to Sand Creek.

A pumping or gas compressor station exists in the northcentral portion of the site (References 1 and 3). A Williams Company pipeline crosses from northwest to southeast across the middle of the site (Reference 2). A Site Plan showing the layout of the site is provided as Figure 2-2 (References 6 and 7).

2.1.4 Site Operational History

Wilcox Oil Company operated as a crude oil refinery from the 1920s until the property was sold by Wilcox Oil Company on 1 November 1963 (Reference 1). According to a 1930 article published in *The Refiner and Natural Gasoline Manufacturer*, the Wilcox Oil Company refinery was operated as a pilot project from about 1920 to 1928 at 1,000 barrels of oil per day by Riley Petroleum Company (Reference 8). Wilcox Oil Company acquired the original facility property (NE ¼, NW ¼, NW ¼ of Section 29) on 11 October 1928 from [redacted] (Reference 1). A modern skimming and cracking plant was constructed in 1929. The upgraded facility had an operating capacity of 4,000 barrels of crude oil per day. The main components of the system consisted of a skimming plant, cracking unit, and redistillation battery with a vapor recovery system and continuous treating equipment. The crude oil was brought directly from the field, eliminating storage and handling facilities, but resulting in crude with high bottom sediment and water.

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At some later date, the Wilcox Oil Company expanded operations by acquiring the former Lorraine Refinery facility west of the railroad and the tank farm area to the east of the refinery (Reference 1). The company sold the original site plus the expanded areas, totaling approximately 110 acres, to (b) (6) on 1 November 1963. Most of the equipment and storage tanks that remained on-site in 1963 were auctioned and have been salvaged for scrap iron by private land owners. The Wilcox Oil Company no longer operates in Oklahoma, and, based on information acquired from the Oklahoma Secretary of State's office, this company merged with Tenneco Oil Company in 1967. According to file information, (b) (6) acquired the original refinery property from (b) (6) (b) (6) on 27 March 1973. It is not known if, or when, the (b) (6) acquired the property from (b) (6).

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(b) (6) other son and daughter-in-law (b) (6) live on the site in one of the former refinery buildings (Reference 9). The (b) have salvaged the former refinery tanks and structures for scrap iron. The (b) live on-site in a mobile home. Three people, (b) (6) and their 16-month-old daughter, live at the (b) residence (Reference 2). The (b) raise chickens and horses on their property. Based on aerial photographs, the (b) residence is on top of a former surface impoundment (References 6 and 7). Aerial photos also indicate that their property includes portions of a former aboveground storage tank and berm, in addition to a second surface impoundment.

2.1.5 Previous Investigations

WESTON reviewed available EPA CERCLA file information regarding site investigations and activities completed prior to this ESI. These investigations and their results are summarized below:

- EPA completed a Potential Hazardous Waste Site Identification form on 7 June 1994 (Reference 10).

- The ODEQ performed a PA for the Wilcox site on 15 December 1994 (Reference 1). The PA indicated that contamination of groundwater and soils at the site had been observed and that potential receptors exist for these pathways. The PA then recommended a Site Inspection be conducted in order to better characterize the site and to determine whether threats to human health and the environment exist.

2.1.6 Nearby Land Use

Land use in the vicinity of the site was observed during the site reconnaissance. The site is located near the northern city limits of Bristow, Oklahoma. The land adjacent to the site is described as follows (References 1 and 2):

- The site is bordered to the east and southeast by undeveloped land and scattered farms.

- The site is bordered immediately to the southwest by the City of Bristow.

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- The site is bordered immediately to the north by undeveloped land with scattered residences and commercial properties. Historical data such as aerial photos, Sanborn Fire Insurance (Sanborn) maps, and topographic maps show evidence of a former refinery and associated tank farm north of the site.

- The site is bordered to the west by the St. Louis and San Francisco Railroad. West of the railroad tracks are the First Assembly of God Church and the associated pastor's residence.

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Because the site is in a former oil field, alternative source sites that may be contributing a release of hazardous substances similar to those found at the Wilcox site were identified. Alternative sources of hazardous substances include former refineries located west and north of the site. Little is known about the dates of operation of these refineries. Sanborn maps from 1915 and 1920 show that the property west of the site was occupied by Continental Refining Company, while property north of the site was occupied by Indiahoma Refining Company (Reference 11). A 1923 Sanborn map shows properties immediately west and northwest of the site occupied by the Lorraine Refining Company. West of the Lorraine Refinery and east of State Highway 66 is Roland Refining Company. The 1961 Sanborn map identifies the entire area west of the site as the "former location of Producers Oil Co, Oil Refinery." A Creek County Tax Assessor ownership map (unknown date) shows areas to the north owned by Ohio Oil (Reference 12). A historic aerial photo from 1956 shows refinery and tank farm areas to the north and west of the Wilcox facility vacant (Reference 6). These refineries are reportedly being investigated as separate sites by ODEQ.

2.2 SUMMARY OF SITE CONCERNS

Possible concerns associated with the sources at the site and the migration of, or exposure to, site-attributable hazardous substances through the groundwater, surface water, soil exposure, and air pathways include the following:

- The presence of hazardous substances at the site is of concern. A discussion of the waste characteristics of the sources sampled during the ESI is provided in Section 4 of this report.

- A release to groundwater is of major concern because sources at the site have no groundwater containment features. The site overlies an unconfined aquifer that private residences north of the site use as a water source. In addition, the site may overlie a recharge zone to another aquifer that is used for public supply.

- A release to surface water is of major concern because of the proximity to surface water bodies and the lack of containment structures around potential waste sources. Wetland frontages occur in the downstream segments of Sand Creek and the Little Deep Fork Creek. Limited recreational fishing occurs in Sand Creek and the Little Deep Fork Creek.

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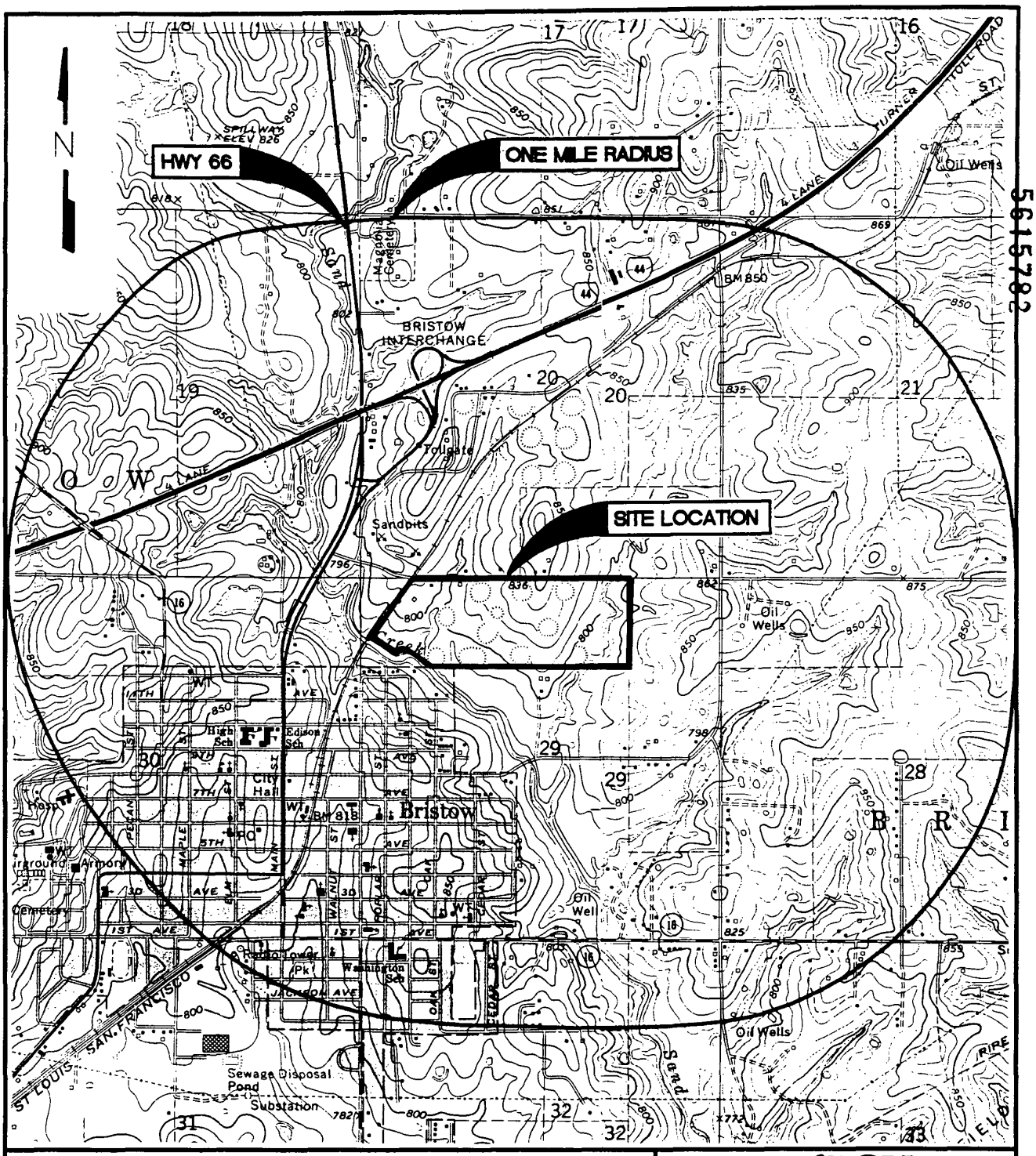
- A release from the soil exposure pathway is of concern. Suspected areas of soil contamination are near residences. However, on-site sources occur within fenced sections of private properties and the nearby population is relatively small.

- A release to air is of some concern because of the potential for soil contamination at the site. Although a resident population has been established for the site, the nearby population is small.

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BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW QUADRANGLE
SLICK QUADRANGLE
OKLAHOMA
7.5 MINUTE SERIES (TOPOGRAPHIC)
1973 SERIES

0 1000 2000
SCALE IN FEET

WESTON MANAGERS DESIGNERS/CONSULTANTS

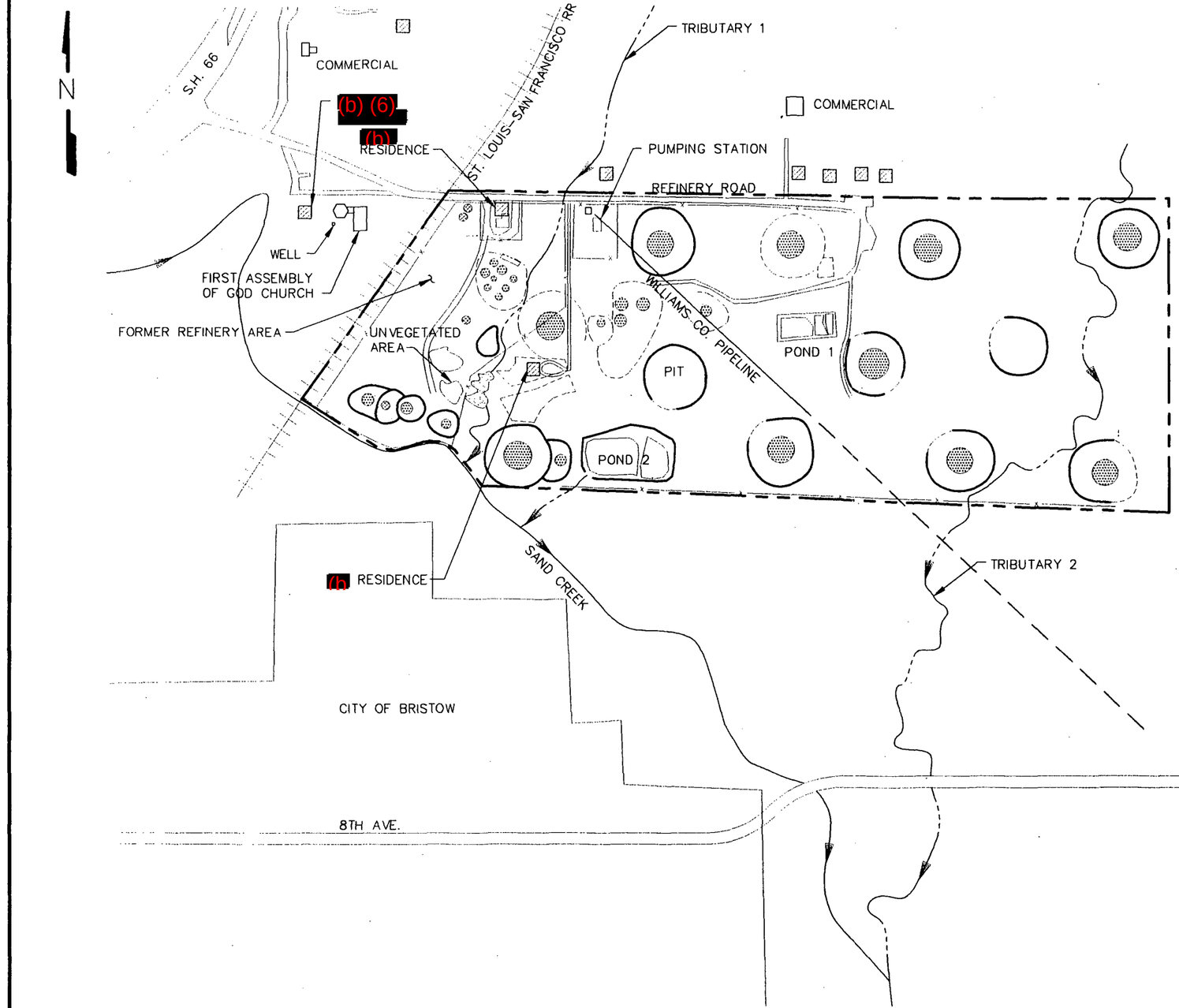
FIGURE 2-1
SITE AREA MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-028-0600

5615782



LEGEND

- CUT/LEVELED BERM
- FENCE
- RESIDENCE
- ABOVE GROUND TANK
- BERM
- FORMER LOCATION OF TANK
- SITE BOUNDARY
- POND

0 250 500
SCALE IN FEET

SOURCES: ACE AERIAL, 1966 AERIAL PHOTO
AERIAL OKLAHOMA, 1995 AERIAL PHOTO

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 2-2
SITE PLAN

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

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SECTION 3
SAMPLE COLLECTION AND ANALYSIS

Sample collection and analysis are summarized in this section of the report. The related analytical results applicable to the evaluation of on-site sources and of the migration and exposure pathways are summarized in the subsequent sections of this report.

3.1 SAMPLE COLLECTION

In general accordance with the objectives of the ESI, WESTON implemented a sampling strategy primarily aimed at documenting the presence and migration of hazardous substances at the Wilcox site. WESTON collected samples from on- and off-site locations from 18 November to 20 November 1996. At the request of EPA, WESTON did not collect proposed samples from properties north of the Refinery Road, where there is evidence that other refineries once existed. These other refineries are reportedly being investigated as separate sites by ODEQ. In addition, two proposed soil samples (SS-09 and SS-10) were not collected because access could not be obtained to the residential properties where these samples were to be collected. WESTON completed the ESI sampling activities in general accordance with the site-specific TWP and HASP, as well as the other documents listed in Subsection 2.1.3.

WESTON collected a total of 19 samples to document and characterize sources. These samples included 8 high-concentration waste samples (WS-01 through WS-08) and 8 low-concentration soil samples (SS-04 through SS-08, SS-11 through SS-13). Three samples (WS-06, SS-08, SS-13) were collected as field duplicate samples for quality assurance/quality control (QA/QC) purposes. In addition, three soil samples (SS-01, SS-02, SS-03) were collected from off-site locations to characterize background concentrations in soils. All samples were collected from 0 to 6 inches below ground surface (bgs); all residential soil samples were collected from the resident's property and within 200 feet of the residence.

WESTON also collected 10 sediment samples (SED-01 through SED-10) from surface water bodies to determine if a release of hazardous substances from sources at the site has occurred. Sediment sample results are discussed in Section 6, Surface Water Pathway.

3.2 ESI SAMPLE LABORATORY ANALYSIS

WESTON shipped the ESI inorganic samples to ARI Laboratories in Seattle, Washington, by Federal Express Priority Overnight Service. Samples requiring organic analyses were delivered to AATS Laboratory in Broken Arrow, Oklahoma. Waste samples requiring high-concentration analyses were sent to WESTON Environmental Metrics, Inc. (EMI) laboratories in University Park, Illinois. Contract Laboratory Program (CLP) data package excerpts from the laboratory data packages prepared by these laboratories are provided in Appendix B. A data validation review of the CLP laboratory analytical data was performed by the EPA Environmental Services Assistance Team (ESAT) in Houston, Texas. The ESAT data reviewer's comments are also included in Appendix B.

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All ESI samples, with the exception of the waste samples collected on 20 November 1996, were analyzed for the following parameters:

- Target Compound List (TCL) volatile organic compounds (VOCs).
- TCL semivolatile base, neutral, and acid extractable compounds (BNAs).
- TCL pesticides and polychlorinated biphenyls (PCBs).
- Target Analyte List (TAL) inorganic constituents (metals and cyanide).

Waste samples collected on 20 November 1996 were analyzed for TCL VOCs, TCL BNAs, TAL inorganics, and total petroleum hydrocarbons (TPH) constituents, as requested by EPA.

Sample stations, descriptions, and rationales are summarized in Table 3-1. On-site soil, sediment, and surface water sample locations are shown in Figure 3-1; area sample locations are shown in Figure 3-2.

Analytical results of all samples collected during this ESI are provided in Appendix C, Tables C-1 through C-24. The Target Compound List (TCL) for organic compounds and Target Analyte List for inorganic constituents (TAL) for the above parameters are presented in Tables D-1 and D-2 in Appendix D.

3.3 DATA VALIDATION

The EPA Region 6 ESAT in Houston, Texas, performed data validation for the ESI analytical data packages prepared by the CLP laboratories. The validators reviewed the data packages to verify that they meet the EPA technical requirements and QA/QC guidelines established in the EPA CLP Scope of Work (SOW) for the analyses. The validators reviewed the data packages for the following items:

- The sample holding times were reviewed to verify that the ESI samples were analyzed within contractual and technical holding time limits.
- The instrument calibrations were reviewed to verify that the calibration for target compounds met contractual QC criteria.
- Analyses were performed on method blanks, and these results were reviewed to locate potential bias.
- Surrogate recoveries were reviewed to verify that recoveries were within contractual requirements.
- Matrix spike recoveries were reviewed to verify that method recoveries were within acceptable QC limits and to determine if biases in the sample results were possible.
- Duplicate results were reviewed to verify that laboratory precision was within technical QC limits.
- The data generated by analyses outside of QC tolerances were evaluated for potential bias in the results (i.e., the reported concentrations are lower or higher than the actual

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concentrations for the sample). Potentially biased data have been qualified as estimated and are J-flagged. A "^" indicates a high biased result, while a "v" indicates a low biased result.

3.4 DATA USABILITY

In light of potential QC issues raised in the validation reports, WESTON evaluated the data to verify their suitability for developing and meeting the objectives of the ESI.

Review of the data validation reports indicate that most of the ESI data for site-attributable constituents were generated within CLP-allowable analytical QC tolerances. For the data generated outside of QC limits, the reported data quality issues were minor and do not affect overall data usability. The usability of the data was evaluated by WESTON as follows:

- The data generated by analyses within the CLP contract required laboratory QC limits were considered unbiased and have been used in the ESI without qualification. This includes all data reported to be acceptable by the data validators. Most data for site-related constituents falls into this category.

- Some data were determined to be biased by ESAT. Biased data were used without additional qualification. Data that are J-flagged without a high or low bias qualifier are considered estimated with an unknown bias.

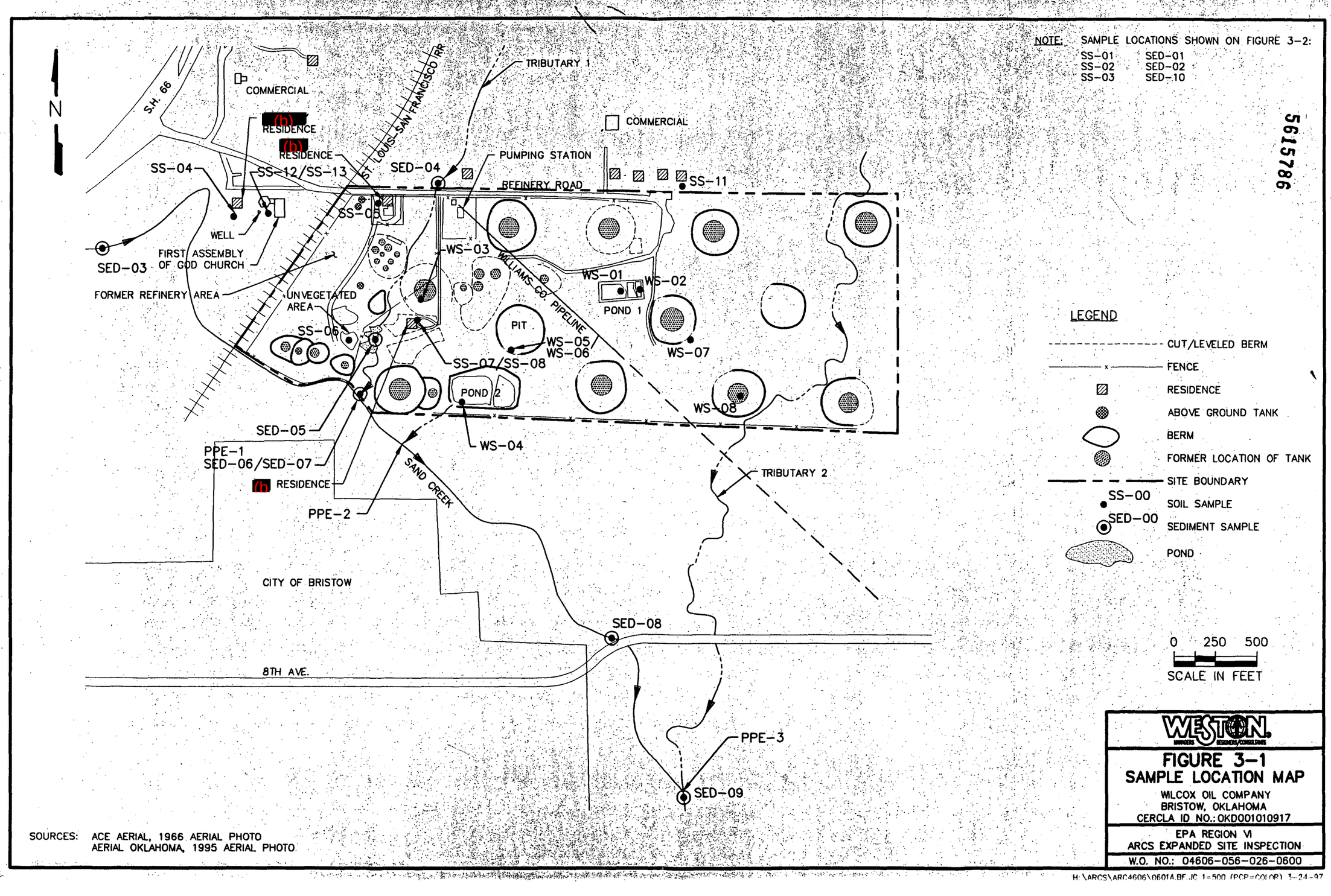
- Based on historical site activities and the results of ESI sampling, pesticides and inorganic constituents detected in some of the samples do not appear to be attributable to the site and were qualified by WESTON as "NA" (NA = Not Attributable).

- A qualifier was added by WESTON to results below the laboratory sample quantitation limit (BSQL).

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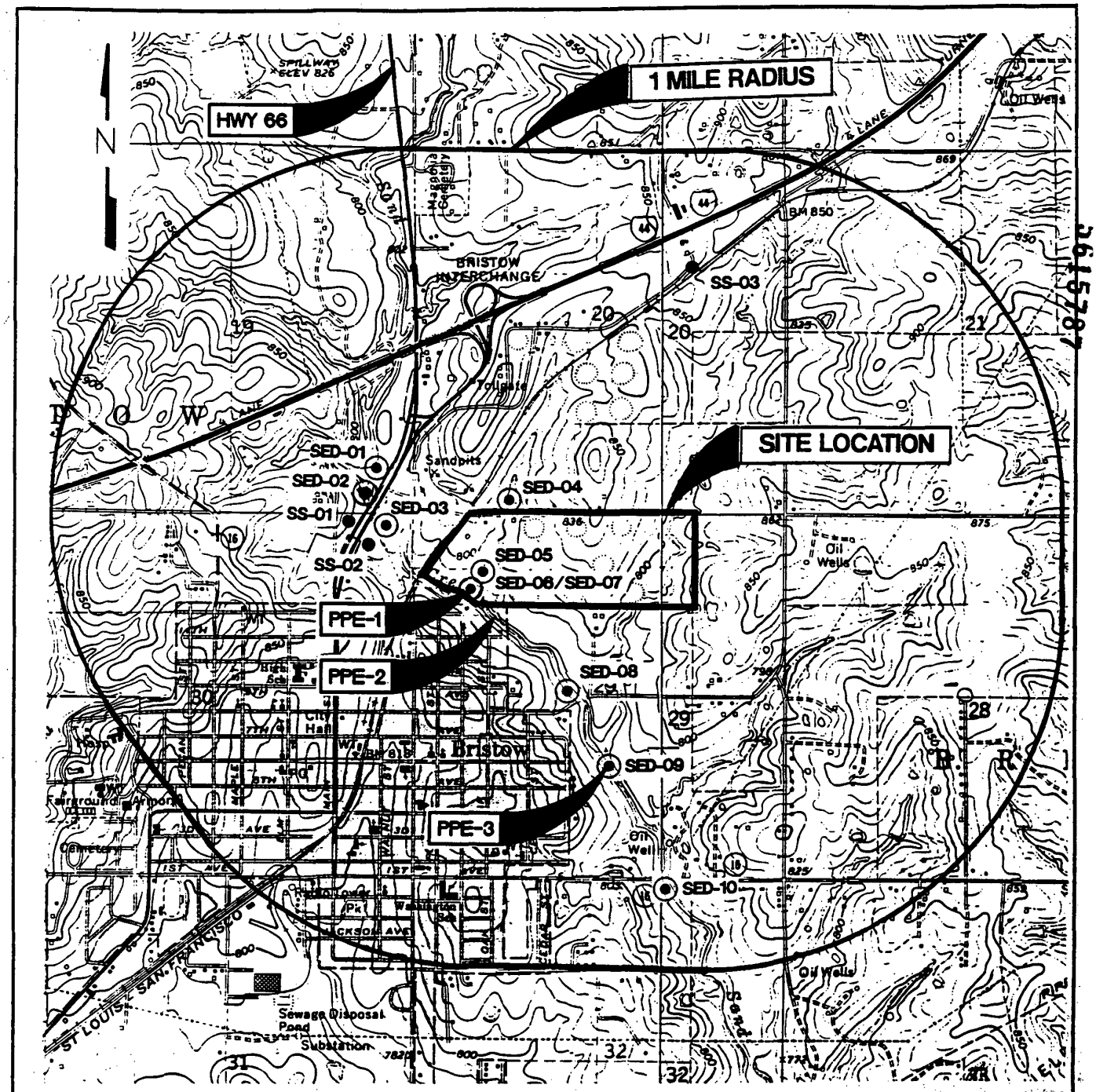
FIGURE 3-1
SAMPLE LOCATION MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

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LEGEND

SED-01 SEDIMENT SAMPLE LOCATION

SS-01 SOIL SAMPLE LOCATION

0 1000 2000

SCALE IN FEET

BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW QUADRANGLE
SLICK QUADRANGLE
OKLAHOMA
7.5 MINUTE SERIES (TOPOGRAPHIC)
1973 SERIES

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 3-2
AREA SAMPLE LOCATION MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

Table 3-1
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sampling Station Descriptions and Rationales

Station Identification/Type	Description	Rationale	Sample Identification/QC Type
SED-01 Background	Low concentration sediment sample collected from Sand Creek, west of S.H. 66 and upstream of the PPE.	To document a background levels of constituents in the surface water pathway.	SED-01 Normal
SED-02 Background	Low concentration sediment sample collected from Sand Creek, west of S.H. 66 and upstream of the PPE.	To document background levels of constituents in the surface water pathway.	SED-02 Normal
SED-03 Characterization	Low concentration sediment sample collected from Sand Creek, east of S.H. 66 and upstream of the PPE.	To determine levels of potential contaminant runoff from the former Lorraine Refinery located west of the site.	SED-03 Normal
SED-04 Characterization	Low concentration sediment sample collected from Tributary 1, just north of the refinery road.	To determine levels of potential contaminant runoff from former refineries to the north of the site.	SED-04 Normal
SED-05 Characterization	Low concentration sediment sample collected from pond on Tributary 1 (b) (6) behind the (b) residence.	To document a release of site-attributable hazardous constituents to the surface water pathway.	SED-05 Normal
SED-06 Characterization	Low concentration sediment sample collected from Sand Creek, at PPE1.	To document a release of site-attributable hazardous substances to the surface water pathway.	SED-06 Normal SED-07 Duplicate
SED-08 Characterization	Low concentration sediment sample collected from Sand Creek, approximately 0.4 mile downstream of PPE1.	To document a release of site-attributable hazardous substances to the surface water pathway.	SED-08 Normal
SED-09 Characterization	Low concentration sediment sample collected from Sand Creek at PPE3, approximately 0.6 mile downstream of the PPE1.	To document a release of site-attributable hazardous substances to the surface water pathway.	SED-09 Normal
SED-10 Characterization	Low concentration sediment sample collected from Sand Creek, approximately 0.4 mile downstream of PPE3.	To document contaminant migration in the surface water pathway.	SED-10 Normal
SS-01 Background	Low concentration soil sample collected from an off-site property east of State Highway 66.	To characterize background levels of constituents in soils.	SS-01 Normal

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Table 3-1 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sampling Station Descriptions and Rationales

Station Identification/Type	Description	Rationale	Sample Identification/QC Type
SS-02 Background	Low concentration soil sample collected from an off-site property, west of State Highway 66.	To characterize background levels of constituents in soils.	SS-02 Normal
SS-03 Background	Low concentration soil sample collected from an off-site property north of the site.	To document the background levels of constituents in soils.	SS-03 Normal
SS-04 Characterization	Low concentration soil sample collected from the yard of the [redacted] residence.	To document the presence of hazardous constituents in surface soils.	SS-04 Normal
SS-05 Characterization	Low concentration soil sample collected from the yard of the [redacted] residence.	To document the presence of hazardous constituents in the surface soils.	SS-05 Normal
SS-06 Characterization	Low concentration soil sample collected from bare, unvegetated area in the southern portion of the [redacted] property.	To document the presence of hazardous constituents in surface soils.	SS-06 Normal
SS-07 Characterization	Low concentration soil sample collected from the yard of the [redacted] residence.	To document the presence of hazardous constituents in surface soils.	SS-07 Normal SS-08 Duplicate
SS-11 Characterization	Low concentration soil sample collected from yard [redacted] residence (off-site).	To determine if hazardous constituents exist in residential surface soils.	SS-11 Normal
SS-12 Characterization	Low concentration sample collected from yard behind the First Assembly of God church.	To characterize and document the presence of hazardous constituents in on-site soils.	SS-12 Normal SS-13 Duplicate
WS-01 Characterization	High concentration waste sample collected from western portion of Pond 1.	To characterize and document the presence of hazardous constituents in the pond.	WS-01 Normal
WS-02 Characterization	High concentration waste sample collected from eastern portion of Pond 1.	To characterize and document the presences of hazardous constituents in the pond.	WS-02 Normal

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Table 3-1 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sampling Station Descriptions and Rationales

Station Identification/Type	Description	Rationale	Sample Identification/QC Type
WS-03 Characterization	High concentration waste sample collected from seep located north of the (b) residence.	To characterize hazardous constituents in residential property soils and document an on-site source.	WS-03 Normal
WS-04 Characterization	High concentration waste sample collected from west end of Pond 2.	To characterize and document the presence of hazardous constituents in the pond.	WS-04 Normal
WS-05 Characterization	High concentration waste sample collected from on-site Pit.	To characterize and document the presence of hazardous constituents in the Pit.	WS-05 Normal WS-06 Duplicate
WS-07 Characterization	High concentration waste sample collected along the overland flow path downgradient of a tank bottom, near the cut berm.	To characterize and document the presence of hazardous constituents associated with the tank bottom area.	WS-07 Normal
WS-08 Characterization	High concentration waste sample collected from a tank bottom.	To characterize and document the presence of hazardous constituents in the tank bottom area.	WS-08 Normal

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SECTION 4
SOURCE CHARACTERIZATION

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The sources of hazardous substances identified at the site are described in this section of the report. Relevant data related to the sources are provided. The related analytical results applicable to the evaluation of the migration and exposure pathways are summarized in the subsequent pathway sections of the report. Potential sources identified and sampled during the ESI include tank bottoms, pits, ponds, and areas of suspected soil contamination.

4.1 SOURCES OF CERCLA HAZARDOUS SUBSTANCES

The contaminants found on site may be directly related to crude oil or petroleum products, in which case they may not be addressable under CERCLA because of the petroleum exclusion provisions contained in the law's definition of hazardous waste. However, waste petroleum products that contain higher concentrations of hazardous substances than the virgin product are not considered to be excluded. Also, certain petroleum refining wastes are defined as Resource Conservation and Recovery Act (RCRA) wastes in 40 *Code of Federal Regulations* (CFR) 261.31 and are not excluded. These RCRA wastes include American Petroleum Institute (API) separator sludge, leaded tank bottoms, refinery primary oil/water/solids separation sludge, and refinery secondary (emulsified) oil/water solid separation sludge.

4.2 SOURCE DESCRIPTIONS AND ANALYTICAL RESULTS

Sample results from sources are considered significantly above background levels if they exceed three times the maximum background concentration. Samples with concentrations of constituents greater than three times the maximum background levels are provided in Tables 4-1 through 4-8. The source contaminants include semivolatile organic constituents, some volatile organics, and metals such as lead. Contamination at several potential sources has not been documented through sampling, therefore, additional CERCLA-eligible sources may be present on-site. These potential sources include the four ASTs located on the (b) property, numerous tank bottom areas, and impoundments. Potential and documented CERCLA-eligible sources at the site are discussed below and are illustrated in Figure 2-2.

4.2.1 Tank Bottoms

Based on the field observations, aerial photographs, and Sanborn maps, at least 11 bermed areas, formerly containing aboveground storage tanks (ASTs), have been identified on-site (References 3, 6, 7, and 11). The ASTs have been cut down and removed, leaving tank residue and bottoms. These areas are shown in Figure 2-2 (Site Plan). Based on aerial photographs, the circular berms measure up to 300 feet in diameter, while the tank bottoms measure up to 150 feet in diameter (Reference 6 and 7). Sanborn maps indicate that tanks in these bermed areas had volumes ranging from 1,000 barrels to 55,000 barrels (Reference 11). Contents listed for the tanks include crude oil, fuel oil, gasoline, napthene, and kerosene. The Sanborn maps also show many of the tanks surrounded by 3- and 4-feet high berms. Almost all of the aboveground tanks have been removed with the exception of four tanks located on the (b) property (western portion of the site) (Reference 7). Most of the berms that formerly contained ASTs have been removed. During sampling activities, it was noted that many of these circular areas contained oily, tarry, and black asphalt-like materials.

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One of the tank bottom areas is adjacent to the (b) residence. A portion of this area is surrounded by a fence and is covered with grass. Seeps of black material were noted in this area, and one waste sample (WS-03) was collected from a seep during ESI activities. Results for sample WS-03 show elevated concentrations of pyrene (54,000 ug/kg) and TPH (293,000 mg/kg).

WESTON also collected two high-concentration waste samples (WS-07 and WS-08) from tank bottom areas located in the eastern portion of the site (b) property). Results for both samples showed high TPH (85,700 mg/kg and 23,200 mg/kg, respectively); however, only the results from WS-08 showed any other constituents greater than three times the background concentration. Results for waste sample WS-08 showed cyanide (0.95 mg/kg), manganese (938 mg/kg), selenium (0.47 mg/kg), silver (0.9 mg/kg), and zinc (160 mg/kg).

Since no other constituents besides TPH were detected above background in WS-07, only the tank bottom areas corresponding to WS-03 and WS-08 are considered CERCLA-eligible sources.

4.2.2 Surface Impoundments

At least four former surface impoundments are located in the central portion of the site (Reference 1). These locations were verified with aerial photographs (References 6 and 7). The total depth and historic use of these ponds and pits is not known.

Pond 1—A 1966 aerial photo shows that Pond 1 measured approximately 250 feet by 100 feet and was divided into three rectangular cells by berms. Currently the pond is backfilled and has no berms. (b) (6) stated he had the berms leveled and the ponds filled in recently because of safety concerns. Oily seeps were observed in this area during the site reconnaissance and sampling visit. Two waste samples (WS-01 and WS-02) were collected from the seeps in this pond. Organic vapor analyzer (OVA) readings greater than 1,000 units above background were detected in the sample hole for WS-01. Constituents detected in the waste samples that were significantly above background include toluene (270 ug/kg), total xylenes (280 ug/kg), and pyrene (230,000 ug/kg). TPH was detected at 494,000 mg/kg.

Pond 2—Pond 2 measures approximately 400 feet by 250 feet and is divided by a berm into two cells. The berm in the southwest corner of the pond has been cut, and surface water runoff flows through this breach into a flowing drainage channel that empties into Sand Creek at PPE-2. The pond is vegetated with grasses and brush and contained shallow pond water at the time of sampling. One waste sample (WS-04) was collected from the southwestern portion of this pond, near the breached berm. OVA readings were approximately 1 unit above background at the sample location. Constituents detected significantly above background in the waste sample were a large number of inorganics, including lead (47,000 mg/kg) and copper (42.5 mg/kg). TPH was detected at 1,370 mg/kg.

Pit—A 300-feet diameter pit containing black, tarry material was observed during ESI field activities. The southwestern portion of the berm had been cut, and discolored material was noted flowing out of this area. Charred trees and plants were noted in the flow path, possibly indicating a fire had occurred at one time. A waste sample (WS-05) and duplicate waste sample (WS-06) were collected from black material located at the edge of the breached berm. Strong, tar-like odors were noted during sampling, and OVA readings were 60 units above background at the sample location. Both inorganic and

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organic constituents were detected at concentrations greater than three times the background concentration. These constituents include copper (100 mg/kg), arsenic (8.7 mg/kg), lead (3,660 mg/kg), mercury (0.11 mg/kg), selenium (0.84 mg/kg), 2-methylnaphthalene (1.4×10^6 ug/kg), phenanthrene (520,000 ug/kg), acetone (2,200 ug/kg), and total xylenes (450 ug/kg).

(b) **Pond**—This pond covers approximately 10,000 square feet and is located southwest of the (b) residence. The intermittent creek (Tributary 1) flows through this pond. The pond also receives runoff from the (b) (6) properties. During ESI sampling activities, layers of black asphalt-like material were noted on the edge of the pond. One sediment sample (SED-05) was collected from the edge of the pond. Sample results show copper (2.9 mg/kg) and lead (54 mg/kg) significantly above background concentrations.

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4.2.3 Contaminated Soils

Soil samples were collected from four residential properties, the church, and from an unvegetated area located on the (b) (6) property. See Tables 4-5 through 4-8 for soil sample results greater than three times the background concentrations. Based on analytical results, contaminated soils occur in the following areas:

- Church and (b) (6) Residence—This area appears to be the location of refinery operations in which storage, processing, loading, and disposal activities have occurred (Reference 1). Since these areas are considered part of the Lorraine Refinery site, they will not be evaluated as sources that are part of the Wilcox site. Church representatives noted that they have frequently encountered old pipelines and other debris when digging on their property (Reference 2). Debris and trash (broken brick, glass, etc.) partially buried in the surface soils of the church property were observed during ESI activities. One soil sample (SS-04) was collected from (b) (6) residential yard; sample results showed lead (116 mg/kg) significantly above background. Two soil samples (SS-12, SS-13) were collected from the yard behind the church. Soil sample SS-13 was collected as a duplicate of sample SS-12. Results for these samples showed lead (260 mg/kg) and mercury (0.09 mg/kg) significantly above background levels.

- (b) Residence—One soil sample (SS-05) was collected from the (b) yard, approximately 30 feet west of the residence. A large number of constituents were detected in this sample at concentrations greater than three times the background concentrations. These include lead (369 mg/kg), mercury (0.18 mg/kg), zinc (132 mg/kg), benzo(g,h,i)perylene (440 ug/kg), chrysene (690 ug/kg), phenanthrene (790 ug/kg) and pyrene (560 ug/kg) (see Table 4-8).

- Unvegetated Area—A bare, unvegetated area of soil, extending approximately 10,000 square feet, exists in the southern part of the (b) property (southwest portion of the site). This area was covered by silty sand and a white, salt-like substance. Former use of this area is unknown; aerial photographs from the 1960s, 1970s, 1980s and 1990s show this area as vacant and barren (References 6 and 7). One soil sample (SS-06) was collected from this area. Results from this sample show copper (127 mg/kg) and lead (55,049 mg/kg) significantly above background concentrations.

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- (b) Residence—Two soil samples (SS-07, SS-08) were collected from the yard of this property, within 35 feet of the house. Soil sample SS-08 was collected as a field duplicate of SS-07. In addition, a waste sample (WS-03) was collected from black material seeping up in the (b) yard. According to (b) (6), the black material seeps up in several locations in the yard and between the cracks of their driveway. Historic aerial photos show an impoundment-like feature where the (b) mobile home currently exists (References 6 and 7). A large, aboveground storage tank and associated bermed area appear in aerial photos on the adjacent land north of the (b) residence.

  Acetone (48 ug/kg) was detected above background levels in SS-07, but not in SS-08. Results for waste sample WS-03 were discussed previously under the Tank Bottoms subsection and indicate elevated levels of pyrene and TPH.

4.3 SOURCE CHARACTERIZATION CONCLUSIONS

WESTON collected a total of 15 samples (8 high-concentration waste samples plus 7 low-concentration soil samples) to characterize sources at the site. These samples included both characterization and QA/QC samples. Characterization samples collected from sources at the site contain concentrations of a large number of constituents greater than three times background concentrations.

The following conclusions can be drawn from the sample results from the sources:

- Results from soil samples collected from on-site residential yards show elevated concentrations of both organic and inorganic constituents significantly above background levels.

- Results for the waste samples collected from the two tank bottom areas show elevated TPH and other constituents. One tank bottom area showed elevated inorganics, while the other showed elevated pyrene.

- Results for the waste samples collected from the surface impoundments (Ponds 1 and 2, and the Pit) indicate high concentrations of TPH and other constituents. Elevated metals were detected in Pond 2 and the Pit. Elevated organics were detected in Pond 1 and the Pit.

- Former containment features (berms) have been cut or leveled for the impoundments and tank bottom areas; thereby facilitating surface migration of contaminants from the sources.

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TABLE 4-1
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Waste Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	WS-04 WS-04 11/20/96 Normal 0.0'-0.5'	WS-05 WS-05 11/20/96 Normal 0.0'-0.5'	WS-05 WS-06 11/20/96 Duplicate 0.0'-0.5'	WS-08 WS-08 11/20/96 Normal 0.0'-0.5'	Left Blank On Purpose
Metals								
Aluminum (mg/kg)	5580	16740		22100	1070	957	9720	
Antimony (mg/kg)	ND	-------		7.7	4 U	3.6 U	4.7 U	
Arsenic (mg/kg)	1.5	4.5		6.5	8.7	2.6	2.8	
Barium (mg/kg)	58.2	174.6		191	44.2	47.4	129	
Beryllium (mg/kg)	0.28	0.84		1.2	0.11	0.1	0.58	
Copper (mg/kg)	5.3	15.9		42.5	100	74.3	13.9	
Cyanide (mg/kg)	ND	-------		2	0.7 U	0.44 U	0.95	
Lead (mg/kg)	26.3	78.9		47000	3660	2260	77.8	
Magnesium (mg/kg)	744	2232		5080	598	290	999	
Manganese (mg/kg)	233	699		701	86.4	36.7	938	
Mercury (mg/kg)	ND	-------		0.07 U	0.11	0.05 U	0.06 U	
Potassium (mg/kg)	961	2883		3300	293	314	1350	
Selenium (mg/kg)	ND	-------		1 U	0.84	0.44	0.47	
Silver (mg/kg)	ND	-------		2	0.67	0.92	0.9	
Vanadium (mg/kg)	11.2	33.6		38.1	10.9	9.7	26.3	
Zinc (mg/kg)	34.8	104.4		127	66.4	51.7	160	

U Not detected at reported quantitation limit.

Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

5615795

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TABLE 4-2
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Waste Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	WS-02 WS-02 11/20/96 Normal 0.0'-0.5'	WS-05 WS-05 11/20/96 Normal 0.0'-0.5'	WS-05 WS-06 11/20/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose
Volatile Organics								
Acetone (ug/kg)	ND	———		130 U	2200	1000		
Toluene (ug/kg)	ND	———		270	45 J C-BSQL	64 J C-BSQL		
Xylenes (total) (ug/kg)	ND	———		280	380	450		

U Not detected at reported quantitation limit.
J Estimated value.
C-BSQL Below Sample Quantitation Limit

56157796

Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 4-3
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Waste Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	WS-02 WS-02 11/20/96 Normal 0.0'-0.5'	WS-03 WS-03 11/20/96 Normal 0.0'-0.5'	WS-05 WS-05 11/20/96 Normal 0.0'-0.5'	WS-05 WS-06 11/20/96 Duplicate 0.0'-0.5'	Left Blank On Purpose
Semi-Volatile Organics								
2-Methylnaphthalene (ug/kg)	ND	-------		64000 U	49000 U	1.4E6	760000	
Phenanthrene (ug/kg)	34	102		27000 J C-BSQL	49000 U	520000	370000	
Pyrene (ug/kg)	62	186		230000	54000	230000 J C-BSQL	260000 J C-BSQL	

U Not detected at reported quantitation limit.
J Estimated value.
C-BSQL Below Sample Quantitation Limit

5615797

Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 4-4
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Waste Sampling TPH Results Summary of Detections

Analyte	Characterization Sample Concentrations					
	WS-01 WS-01 Normal 0.0'-0.5'	WS-02 WS-02 Normal 0.0'-0.5'	WS-03 WS-03 Normal 0.0'-0.5'	WS-04 WS-04 Normal 0.0'-0.5'	WS-05 WS-05 Normal 0.0'-0.5'	WS-05 WS-06 Duplicate 0.0'-0.5'
Total Petroleum Hydrocarbons						
Total Petroleum Hydrocarbons (mg/kg)	427000	494000	293000	1370	875000	378000

Detected Values are Shaded

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TABLE 4-4 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Waste Sampling TPH Results Summary of Detections

Analyte	Characterization Sample Concentrations					
	WS-07 WS-07 Normal 0.0'-0.5'	WS-08 WS-08 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Total Petroleum Hydrocarbons						
Total Petroleum Hydrocarbons (mg/kg)	85700	23200				

Detected Values are Shaded

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TABLE 4-5
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	SS-04 SS-04 11/18/96 Normal 0.0'-0.5'	SS-05 SS-05 11/18/96 Normal 0.0'-0.5'	SS-06 SS-06 11/18/96 Normal 0.0'-0.5'	SS-12 SS-12 11/18/96 Normal 0.0'-0.5'	SS-12 SS-13 11/18/96 Duplicate 0.0'-0.5'
Metals								
Copper (mg/kg)	5.3	15.9		4.5 L	11.4	127	10.6	11.4
Lead (mg/kg)	26.3	78.9		116 J	369 J	55049 J	251 J	260 J
Mercury (mg/kg)	ND	-------		0.05 U	0.18	0.06 U	0.08 L	0.09 L
Zinc (mg/kg)	34.8	104.4		36.3	132	25.7	70.1	69.7

L Reported concentration is between the IDL and the CRDL.
J Estimated value.
U Not detected at reported quantitation limit.

5615800

Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 4-6
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	SS-07 SS-07 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Volatile Organics								
Acetone (ug/kg)	ND	-------		48 J				

J Estimated value.

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Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 4-7
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	SS-05 SS-05 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Semi-Volatile Organics								
Benzo(g,h,i)perylene (ug/kg)	ND	-------		440 J				
Chrysene (ug/kg)	50	150		690 J				
Phenanthrene (ug/kg)	34	102		790 J				
Pyrene (ug/kg)	62	186		560 J				

J Estimated value.

561580?

Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 4-8
SUMMARY OF SOURCE AREAS

SOURCE TYPE	SOURCE NAME	AREA (ft^2)	CONTAMINANTS
Surface Impoundment	Pond 1	25,000	toluene, xylene, pyrene, TPH
Surface Impoundment	Pond 2	100,000	heavy metals, TPH
Surface Impoundment	Pit	70,686	heavy metals, acetone, xylenes, 2-methylnaphthalene, phenanthrene, TPH
Surface Impoundment	(b) Pond	10,000	copper, lead
Contaminated Soil	Unvegetated Area	10,000	copper, lead
Contaminated Soil	(b) Residence	22,500	acetone
Contaminated Soil	(b) Residence	unknown	lead, mercury, zinc, semivolatiles
Contaminated Soil	Tank Bottom (b) Property)	12,272	cyanide, manganese, selenium, silver, zinc, TPH
Contaminated Soil	Tank Bottom (b) Residence)	12,272	pyrene, TPH

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SECTION 5
GROUNDWATER PATHWAY

A discussion of the groundwater pathway, one of four pathways of potential hazardous waste migration assessed in this report, is provided in this section. The discussion focuses on the aquifer characteristics of the region, the likelihood of release of hazardous substances to groundwater, and the potential targets of hazardous waste migration through the groundwater pathway.

5.1 HYDROGEOLOGIC DESCRIPTION

Regionally, the site is located on an outcrop of the Pennsylvanian-age Barnsdall Formation (Reference 1). Pennsylvanian strata in the area strike north-south, and regional dip is to the west at approximately 30 to 90 feet per mile. Progressively younger strata are encountered from east to west.

The Barnsdall Formation is heterogeneous in character and contains sandstone interbedded with silty and sandy shales (Reference 1). It is capable of producing water and is a bedrock aquifer. However, it is not considered to be a Principal Ground Water Resource by the Oklahoma State Department of Health. The Barnsdall aquifer is unconfined with a shallow water table and is approximately 200 feet thick in the area of the site. The Barnsdall aquifer is used primarily by private wells in the area as a source of drinking water.

The other aquifer in the site area is the Vamoosa-Ada aquifer, located west of the site. Most nearby public supply wells produce from this aquifer. This aquifer includes (from youngest to oldest) the following Pennsylvanian-age formations (Reference 1):

- Lower Vanoss
- Ada
- Vamoosa
- Tallant
- Uppermost Barnsdall

The Vamoosa-Ada strata crop out in the western one-third to one-half of Creek County and are predominantly composed of red and brown coarse- to fine-grain, well-sorted sandstones interbedded with dark red sandy to silty shale (Reference 1). The Tallant Formation consists of 10 to 60 feet of fine- to medium-grained sandstone, overlain by 25 to 65 feet of shale (Reference 13). Total thickness of the Tallant Formation ranges from 0 to 100 feet. Maps from the Oklahoma State Department of Health indicate that the site is located within a potential recharge area for the Vamoosa-Ada aquifer (Reference 13). However, the Tallant Formation may act as a confining unit between the uppermost Barnsdall and the overlying Vamoosa-Ada aquifer, west of the site (Reference 13).

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5.2 LIKELIHOOD OF RELEASE

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Important factors related to the likelihood of a release from source hazardous substances at the site to groundwater are presented in this section. Relevant analytical data for the pathway are provided.

5.2.1 Depth to Groundwater

The depth to the shallowest water-bearing unit is reportedly less than 25 feet (Reference 1). However, a depth of 60 feet was reported for the first water-saturated sandstone in a domestic water well located less than ¼ mile north of the site.

5.2.2 Depth of Contamination

Based on samples collected from the on-site sources as part of the ESI field activities, the maximum depth of known contamination is ½ foot bgs. Because subsurface sampling was not conducted as part of this ESI, the actual depth of contamination is not known.

5.2.3 Net Precipitation

Net precipitation is equivalent to total annual precipitation less potential evapotranspiration. The net precipitation for the vicinity of the site using the Thornthwaite method is approximately 8.91 inches per year (Reference 14).

5.2.4 Thickness of Impermeable Layers

An impermeable confining layer is not present between sources at the site and groundwater in the Barnsdall formation (Reference 1). Nor has it been demonstrated that there is an impermeable layer between the Barnsdall and younger formations in the Vamoosa-Ada aquifer.

5.2.5 Hydraulic Conductivity of Impermeable Layer

An impermeable layer does not exist between the surface and groundwater; therefore, a hydraulic conductivity value cannot be assigned.

5.2.6 Analytical Results from Previous Investigations

No previous groundwater analytical results from previous investigations are known to exist.

5.2.7 ESI Groundwater Sampling and Analytical Results

No groundwater sampling was conducted as part of this ESI.

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5.3 GROUNDWATER PATHWAY TARGETS

The potential receptors, or targets, of the groundwater pathway include the population and resources that rely on local aquifers as a source of water supply. The targets identified for the groundwater pathway are discussed in the following sections.

5.3.1 Nearest Well

The nearest identified active well to the site is a private well, located ¼ mile north of the site (Reference 1). It is 230 feet deep and produces water from sandstones in the lower part of the Barnsdall Formation. The nearest active public supply well is located almost 1 mile southwest of the site and produces from the Vamoosa-Ada aquifer. It should be noted that these wells were not sampled during this ESI; it is WESTON's understanding that groundwater sampling will be conducted as part of other site investigations led by ODEQ.

Water wells on the First Assembly of God Church property and on the (b) (6) property have been abandoned because of oil contamination (Reference 1). The (b) well is approximately 200 feet deep and is plugged. Oily contamination reportedly came from perforations in shallow sand intervals. The church well is 110 feet deep, but is screened at 40 feet in the shallow water zone. The (b) (6) currently have a water line from the City of Bristow, and they sell water to the (b) (6) residence, (b) residence, and First Assembly of God Church (References 1 and 3).

5.3.2 Other Nearby Wells

There are 8 active drinking water wells for the City of Bristow located within 4 miles of the site (Reference 1). According to information provided by the ODEQ Water Quality Division, these wells produce from the Vamoosa and Vamoosa-Ada aquifers (Reference 15). In addition, a public supply well that serves 50 residents of the Evergreen Trailer Park is located within a 1- to 2-mile radius of the site. The nearest active public supply well (City of Bristow Well #14) is approximately 1 mile southwest of the site. Residences to the north of the refinery road reportedly receive drinking water from private wells, but the exact number and locations of these wells is unknown (Reference 2). A summary by distance interval of nearby identified active water wells is provided in Table 5-1.

It should be noted that a public supply well (City of Bristow Well #15) located approximately ½ mile southwest of the site was plugged and abandoned because of diesel contamination following a train derailment (Reference 15).

5.3.3 Well Head Protection Areas

No well head protection areas exist within a 4-mile radius of the site (Reference 1).

5.3.4 Groundwater Resources

Resources associated with the groundwater pathway may include irrigation, watering of commercial livestock, commercial food preparation, commercial aquaculture, and water recreation.

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Groundwater within the vicinity of the site is used for irrigation and watering of commercial livestock (Reference 1).

5.4 GROUNDWATER PATHWAY CONCLUSIONS

A release of site-attributable contamination to the groundwater pathway is of major concern because of the following:

- The site is located on an outcrop of the Barnsdall Formation. The Barnsdall aquifer is used by private wells in the area. Oily contamination has been observed in the shallow groundwater zone in abandoned on-site residential wells. Most of the known active private wells are located at distances greater than 1 mile and topographically upgradient from the site. However, there may be unidentified private wells in the area.
-
- The site is located in a potential recharge zone for the Vamoosa-Ada aquifer, the principle aquifer for the City of Bristow public supply wells. However, the Tarrant formation may act as an upper confining unit between the Barnsdall and Vamoosa-Ada aquifers.

- Attribution of contamination to the site may be difficult because of potential contamination associated with the surrounding oil refineries to the north and west. In addition, diesel contamination of groundwater resulting from a train derailment occurs between the site and public supply wells.

WESTON did not perform groundwater sampling as part of this ESI at the request of EPA. It is WESTON's understanding that area groundwater sampling will be performed by ODEQ as part of investigations at adjacent refinery sites.

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TABLE 5-1
SUMMARY OF POPULATION SERVED BY ACTIVE WELLS

DISTANCE FROM SITE (miles)	NUMBER OF PRIVATE WELLS	NUMBER OF PUBLIC WELLS	ESTIMATED POPULATION[1]
0 - 1/4	1	0	3
1/4 - 1/2	0	0	0
1/2 - 1	4	1	176
1 - 2	25	8	4,368
2 - 3	20	0	54
3 - 4	29	0	78
Total	**79**	**9**	**4,679**

Notes:
1. Population has been rounded to nearest whole number.

Source: ODEQ 1994 PA, Reference 1.

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SECTION 6
SURFACE WATER PATHWAY

Surface water is the second of four pathways of potential hazardous waste migration assessed for the site. A discussion of the types of surface water draining the site, the probable point of entry (PPE) for a hazardous substance from the site to enter surface water, the likelihood of a release, and the potential targets of the pathway are discussed in this section.

6.1 HYDROLOGIC SETTING

Regionally, surface water from the Wilcox site flows into the Little Deep Fork drainage basin.

Surface water at the site flows through an overland flow segment, enters the surface water at the PPE in Sand Creek, and flows downstream to the Little Deep Fork Creek. These segments of the surface water pathway are discussed in the following sections.

6.1.1 Overland Flow Segment

Based on available information and USGS topographic maps, drainage from the site flows south and east into two intermittent creeks. The western intermittent creek (Tributary 1) flows from the north, across the (b) (6) property and through the (b) pond. The creek then enters Sand Creek approximately 100 feet south of the site. This creek receives runoff from the north, from the former Wilcox refinery, and from western portions of the former tank farm. The eastern intermittent creek (Tributary 2) receives runoff from the eastern portions of the tank farm. This creek flows approximately 0.4 mile south before reaching Sand Creek. Additionally, there is a small intermittent drainage that connects a pond in the southcentral area of the site with Sand Creek.

6.1.2 Probable Point of Entry

Three PPEs for a release of hazardous substances from the site into perennial surface water bodies have been identified. These PPEs (PPE-1, PPE-2, and PPE-3) occur where on-site intermittent creek flow into Sand Creek. These locations are identified in Figure 6-1.

6.1.3 Surface Water Flow Path

Runoff from the Wilcox site flows south into Sand Creek through PPEs 1, 2, and 3 (References 1 and 2). Sand Creek flows southeast and discharges into the Little Deep Fork Creek approximately 3.5 miles downstream of the PPE-1 (Reference 16). Flow continues in Little Deep Fork Creek for the remaining 11.5 miles of the site surface water pathway.

The surface water pathway is illustrated in Figure 6-1; stream segments and streamflow data are summarized in Table 6-1.

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6.2 LIKELIHOOD OF RELEASE

Important factors related to the likelihood of a release from a source of hazardous substances at the site to surface water are presented in the following section. Relevant analytical data for the surface water pathway are provided as evidence of a release.

6.2.1 Distance to Surface Water

Based on observations made during WESTON's field sampling activities, the shortest distance from a known or potential source of hazardous substances at the site to surface water is approximately 400 feet. This distance was determined from a topographic map by measuring from the unvegetated area on the (b) (6) property to Sand Creek through the intermittent creek (Reference 3). The distance measured between Pond 2 and Sand Creek is also approximately 400 feet.

6.2.2 Flood Frequency

According to flood hazard maps obtained from the Federal Emergency Management Agency (FEMA), portions of the site are in the 100-year flood zone (Reference 17).

6.2.3 2-Year, 24-Hour Rainfall

The 2-year, 24-hour rainfall for the area of the site is approximately 4.25 inches (Reference 18).

6.2.4 Flood Containment

Based on a review of topographic maps and aerial photographs, in addition to observations made during WESTON's field sampling activities, sources at the site have either limited or no containment features for floods. Although berms surround some of the sources at the site, many of the original berms have either been leveled or cut to allow drainage from the sources to run off.

6.2.5 Analytical Results from Previous Investigations

No analytical results exist from previous investigations.

6.2.6 ESI Sediment Sampling and Analytical Results

WESTON collected 10 sediment samples (SED-01 through SED-10) from surface water bodies receiving drainage from the site in an effort to determine if a release of hazardous substances from sources at the site has occurred. One of these samples (SED-07) was a duplicate sample collected for QA/QC purposes. WESTON collected two background samples (SED-01, SED-02) from locations on Sand Creek upstream of the PPEs. Two samples (SED-03, SED-04) were collected to evaluate potential contaminated runoff coming from the former refineries located west and north of the site. Sediment sample SED-03 was collected from Sand Creek, just east of the S.H. 66 bridge, where runoff from the former Lorraine refinery would enter the creek. Sediment sample SED-04 was collected from

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Tributary 1, just north of the refinery road, where runoff from refineries to the north would enter the site. In all cases, the sediment samples were collected from depths ranging from 0 to 6 inches bgs.

Laboratory analytical results for the sediment samples document a release of copper and lead from the site to Sand Creek. These constituents were detected on site, at and downstream of the PPEs in Sand Creek. Sediment sample analytical results significantly above background concentrations are presented in Table 6-2.

6.3 SURFACE WATER PATHWAY TARGETS

The potential targets of the surface water pathway include the population relying on surface water downstream of the PPE as a source of drinking water, as well as downstream fisheries, sensitive environments, and surface water resources. The targets of the surface water pathway are discussed in the following subsections.

6.3.1 Drinking Water Intakes

According to a representative with the ODEQ Water Quality Division, no drinking water intakes exist in the watershed located in Creek County (which includes Sand Creek and Little Deep Fork Creek) (Reference 19). All drinking water is obtained from groundwater sources.

6.3.2 Wetlands and Other Sensitive Environments

Surface water pathway targets include fisheries, drinking water intakes, sensitive environments, and resources that rely on surface water.

Habitats for endangered and threatened species are known to occur in Creek County; however, no sightings or habitats for those species have been observed or reported for the site (Reference 1). A list of endangered and threatened species are in Table 6-3.

WESTON obtained U.S. Fish and Wildlife National Wetlands Inventory (NWI) maps in order to identify wetland areas along the surface water pathway (Reference 20). According to the wetlands maps, small wetland frontages are present along the surface water pathway downstream of the site. The wetlands are summarized in Table 6-4.

6.3.3 Fisheries

According to an official with the Oklahoma Fish and Wildlife office, Sand Creek and Little Deep Fork Creek may be used for limited private fishing (Reference 21). These creeks may therefore be considered fisheries. According to the State of Oklahoma, Sand Creek is considered to be in the "habitat limited aquatic community" subcategory of the fish and wildlife propagation beneficial use category and within the primary body contact subcategory for recreational beneficial use category (Reference 1). The Little Deep Fork Creek is placed in the "warm water aquatic community" subcategory of the fish and wildlife propagation beneficial use and within the "primary body contact" subcategory for recreational beneficial use.

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6.3.4 Resources

Resources associated with the surface water pathway may include irrigation, watering of commercial livestock, commercial food preparation, commercial aquaculture, and water recreation. No resources have been identified for the site surface water pathway.

6.4 SURFACE WATER PATHWAY CONCLUSIONS

WESTON collected a total of 10 sediment samples from surface water bodies in an effort to establish background levels and to determine if a release of on-site hazardous substances to the surface water pathway has occurred. The following conclusions can be drawn from the data from these samples:

- Based on the ESI sampling data, a release of copper and lead to Sand Creek has been documented. These substances were also found in on-site sources as described in Section 4.

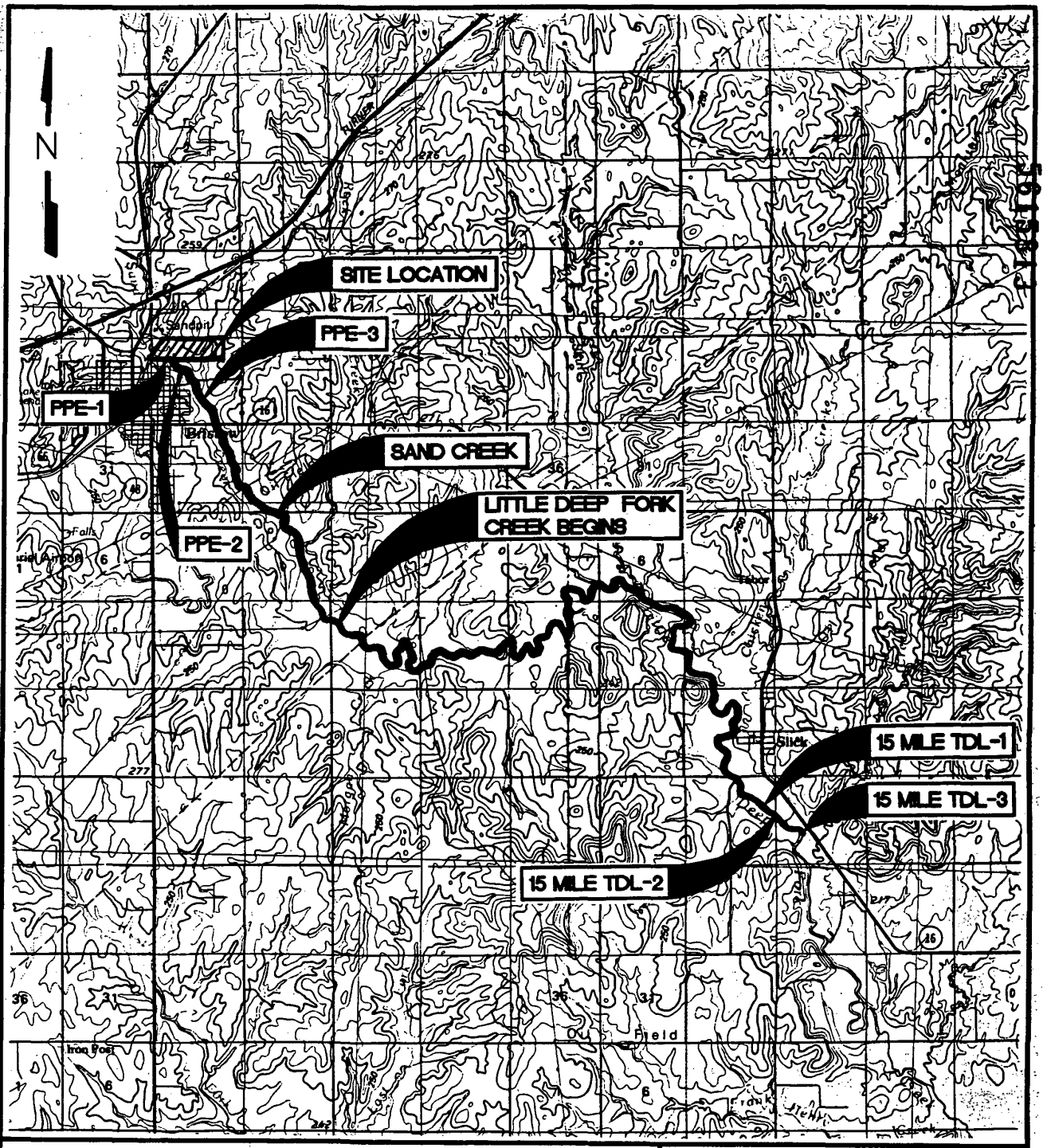
- Wetland frontages occur along segments of Sand Creek and Little Deep Fork Creek, beginning approximately 2.5 miles downstream of the location of sediment sample SED-10, the most downstream documented point of contamination. Sand Creek and the Little Deep Fork Creek are considered recreational fisheries.

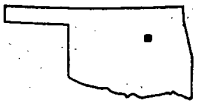
- No habitats for endangered species or drinking water intakes have been documented within the 15-mile target distance limit for the site.

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BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW, OKLAHOMA
30 x 60 MINUTE SERIES (TOPOGRAPHIC)
1983 SERIES
SCALE 1:100,000

0 5000 10,000
SCALE IN FEET

WESTON

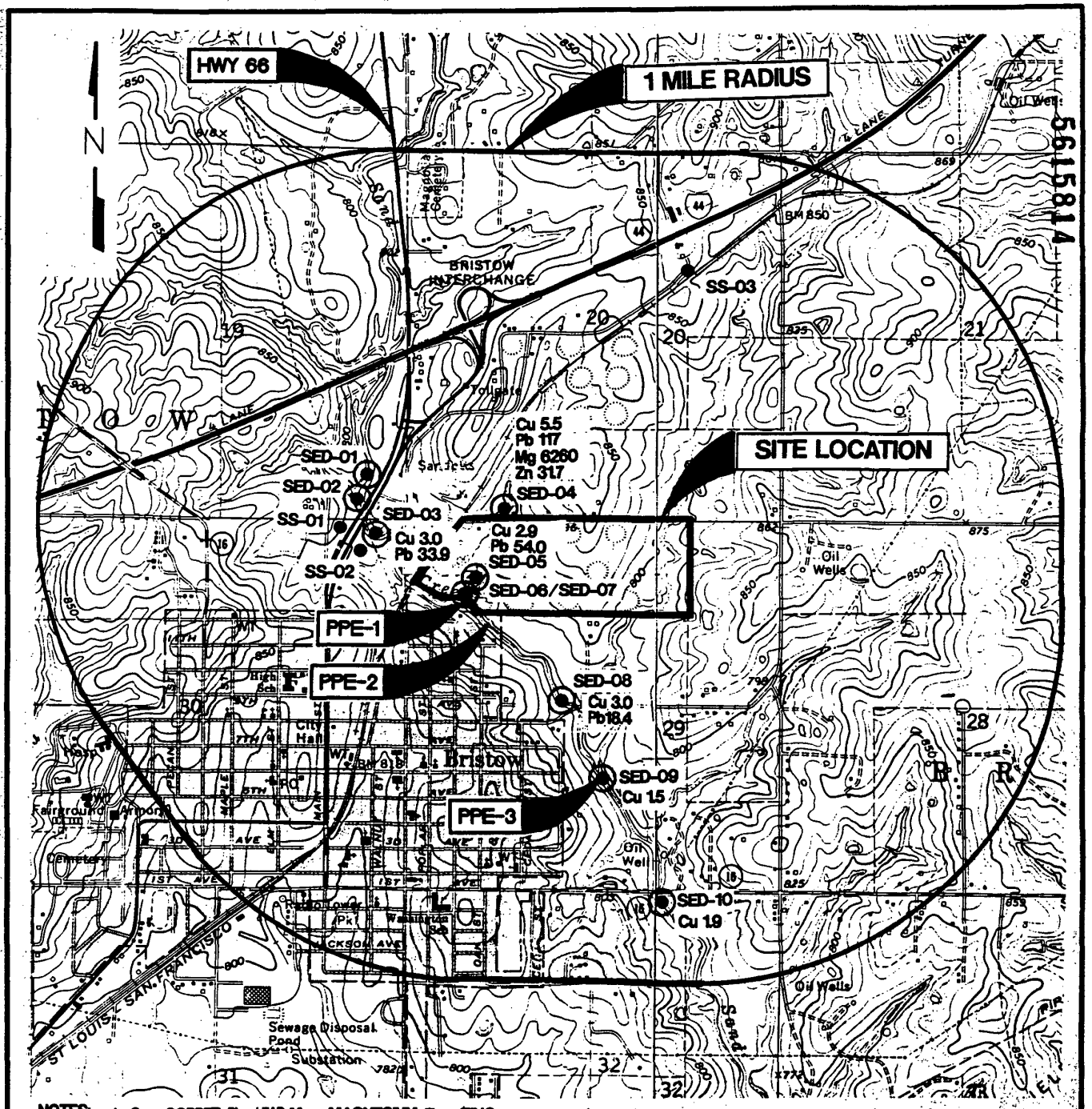
FIGURE 6-1
SURFACE WATER PATHWAY MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

H:\ARCS\ARC4606\0602.JC 1=500 (PCP=COLOR) 2-20-97



NOTES: 1. Cu = COPPER, Pb = LEAD, Mg = MAGNESIUM, Zn = ZINC
2. RESULTS ARE IN mg/kg



BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW QUADRANGLE
SLICK QUADRANGLE
OKLAHOMA
7.5 MINUTE SERIES (TOPOGRAPHIC)
1973 SERIES

LEGEND
SED-01 SEDIMENT SAMPLE LOCATION
SS-01 SOIL SAMPLE LOCATION

0 1000 2000
SCALE IN FEET

WESTON
ENGINEERS/SCIENTISTS/CONSULTANTS

FIGURE 6-2
SEDIMENT SAMPLE STATIONS AND RESULTS
WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

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TABLE 6-1
SURFACE WATER PATHWAY SUMMARY

SEGMENT NAME	SEGMENT LENGTH (miles)			EST. AVERAGE FLOW RATE
	PATHWAY 1	PATHWAY 2	PATHWAY 3	
Sand Creek	3.5	3.4	2.9	50 cfs[1,2]
Little Deep Fork	11.5	11.6	12.1	400 cfs

Notes:
1. cfs = cubic feet per second
2. Source: Reference 1

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TABLE 6-2
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample Date QC Type Depth	SED-03 SED-03 11/18/96 Normal 0.0'-0.5'	SED-04 SED-04 11/18/96 Normal 0.0'-0.5'	SED-05 SED-05 11/19/96 Normal 0.0'-0.5'	SED-08 SED-08 11/19/96 Normal 0.0'-0.5'	SED-09 SED-09 11/19/96 Normal 0.0'-0.5'
Metals								
Copper (mg/kg)	ND	-------		3 LJ^	5.5 L	2.9 L	3 L	1.5 L
Lead (mg/kg)	6	18		33.9 J	117 J	54 J	18.4 J	4.6 J
Magnesium (mg/kg)	333	999		425 L	6260	317 L	465 L	228 L
Zinc (mg/kg)	7.6	22.8		11.6	31.7	11.6	21.7	6 UC

L Reported concentration is between the IDL and the CRDL.
J Estimated value.
UC Not detected at the reported quantitation limit which was raised due to apparent blank contamination.
LJ^{V} Reported concentration is between the IDL and the CRDL. Estimated value.

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Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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TABLE 6-2 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Sampling Results Above Background Concentrations

Analyte	Background Concentration		Characterization Sample Concentrations					
	Maximum Background	3 Times Maximum Background	Station Sample - Date QC Type Depth	SED-10 SED-10 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Metals								
Copper (mg/kg)	ND	-------		1.9 L				
Lead (mg/kg)	6	18		15 Jv				
Magnesium (mg/kg)	333	999		254 L				
Zinc (mg/kg)	7.6	22.8		8.7				

L Reported concentration is between the IDL and the CRDL.
Jv Estimated value and low biased. Actual concentration may be higher than the concentration reported.

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Shaded Values Exceed 3 Times Maximum Background Concentrations for Constituents Attributable to the Site.

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WILCOX OIL COMPANY
BRISTOW, CREEK COUNTY, OK
EPA CERCLA ID NO. OKD001010917

TABLE 6-3
ENDANGERED AND THREATENED SPECIES
CREEK COUNTY, OKLAHOMA

SPECIES	FEDERAL STATUS
Bald Eagle	Endangered
Interior least tern	Endangered
Peregrine falcon	Endangered
Piping plover	Threatened
Cerulean warbler	Category 2 Candidate[1]
Loggerhead shrike	Category 2 Candidate
Prairie mole cricket	Category 2 Candidate
Arkansas River speckled chub	Category 2 Candidate
Texas horned lizard	Category 2 Candidate
Western Snowy plover	Category 2 Candidate
Fissa sedge (Carex fissa)	Category 2 Candidate

Notes:
1. Category 2 - Species needs additional study to determine whether it should be listed as Endangered or Threatened.
2. Source: Reference 1

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TABLE 6-4
SUMMARY OF WETLANDS

STREAM SEGMENT	WETLANDS TYPE[1]	DISTANCE FROM A PPE TO NEAREST WETLANDS FRONTAGE	TOTAL WETLANDS FRONTAGE
Sand Creek	PF01A	PPE-3: 3.0 miles	0.25 mile
Little Deep Fork Creek	PF01A	PPE-3: 3.0 miles	8.5 miles

Notes:
1. PF01A - Palustrine Forested, Broad-Leaved Deciduous, Temporarily Flooded
2. Source: Reference 20

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SECTION 7
SOIL EXPOSURE

Soil exposure is another potential route of exposure to hazardous substances attributable to the site. The discussion in this section focuses on the important soil exposure factors such as soil type, area of contamination, accessibility and the likelihood of exposure, and the potential targets.

7.1 SURFICIAL CONDITIONS

Information regarding the surficial conditions at the site is summarized in this section.

7.1.1 Soil Type

Based on the soil survey for Creek County, the site contains several soil series: the Stephensville and Darnell fine sandy loams, sloping and gently sloping; the Verdigris silt loam; and Oil-waste Land (Reference 22). Soils are described by the soil survey as follows:

- The Stephensville and Darnell fine sandy loams cover the majority of the site. These soils consist of shallow to moderately deep upland soils developed over reddish-yellow to red sandstone or interbedded sandstone and sandy shale. Runoff is slow to moderate, but internal drainage is moderate to rapid.

- The Verdigris silt loam is located in the southwestern portion of the site, along Sand Creek. These soils occupy the flood plains of streams and are moderately well drained; however, they are flooded occasionally to frequently. Parent material consists of slightly acid to weakly alkaline alluvial sediments washed from soils of the prairies.

- Oil-waste Land has been mapped in areas throughout the site, occurring in tank farm and refinery equipment areas. The areas mapped in this miscellaneous land type have been practically ruined for agricultural use by oil and salt-water waste from oil wells. They are more or less gullied and eroded and are almost barren of vegetation. They range in size from one acre to several acres.

The Stephensville and Darnell fine sandy loam series and the Verdigris silt loam are the soils most likely associated with the site prior to being impacted by oil field activities (Reference 1).

7.1.2 Areas of Contamination

Based on the analytical results described in Section 4, several on-site areas of contaminated soils were identified. Refer to Section 4 for a discussion on characterization of contaminated soils as a source.

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7.2 LIKELIHOOD OF RELEASE

Important factors related to the likelihood of exposure to an area of contaminated soil at the site are presented in the following subsections.

7.2.1 Attractiveness of the Site

Sources at the site are located in a pasture that is not used for public recreation and, therefore, has a low attractiveness.

7.2.2 Site Accessibility

The site is fenced and access is restricted. However, (b) (6) stated that children frequent his property despite the presence of fences and verbal warnings. The children have reportedly played in and around the pit and ponds, and (b) (6) expressed a great deal of concern about children falling into the ponds (Reference 2).

7.2.3 Soil Analytical Results from Previous Investigations

Based on file information provided to WESTON by EPA, no soil sampling has been conducted as part of previous investigations.

7.2.4 ESI Soil Sampling and Analytical Results

As discussed in Sections 3 and 4, 11 soil samples (SS-01 through SS-08, SS-11 through SS-13) were collected in an effort to characterize and document the presence of hazardous substances in soils at the site. Two samples (SS-08, SS-13) were collected as field duplicates for quality assurance/quality control (QA/QC) purposes. In addition, three soil samples (SS-01 through SS-03) were collected from off-site locations to establish background concentrations of constituents. The background samples were collected from the same soil series as the site and in areas that appeared to be undisturbed. In all cases, the soil samples were collected from depths ranging from 0 to 6 inches bgs. The ESI sample locations are shown in Figures 3-1 and 3-2 following the text of Section 3. Analytical results from the ESI sampling investigation are presented in Table 4-4 of Section 4. The area of contaminated soils associated with residences could not be determined based on one or two sample locations. Estimates of areas were made using aerial photographs when possible; these estimated areas are presented in Table 4-9.

7.3 SOIL EXPOSURE TARGETS

The resident population living or working in an area of soil contamination, the population living near areas of soil contamination, designated recreational areas, and terrestrial resources such as agriculture are potential targets of soil exposure. The soil exposure targets identified are summarized in the following sections.

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7.3.1 Resident Population

The resident population is defined as those persons living or attending school or day care on a property where site-attributable soil contamination has been documented and whose residence, school, or day care center is within 200 feet of that contamination. Based on the ESI sampling results, a resident population of five has been documented for the Wilcox site. This population includes the two people living in the (b) residence and the three people living in the (b) residence (References 3 and 9).

7.3.2 Worker Population

The worker population is defined as those persons working on a property with an area of site-related sources or soil contamination and whose workplace area is on or within 200 feet of the areas of documented soil contamination.

No workers have workplace areas within 200 feet of the areas of documented soil contamination at the Wilcox site.

7.3.3 Nearby Population

The nearby population includes those persons who live within one mile of areas of soil contamination attributable to the site. Those persons in houses, schools, or day care facilities within one mile of the site have been considered part of the nearby population. The nearby population was estimated using the EPA Geographic Exposure Modeling System (GEMS) database, 1990 Census information, and a house count conducted during the 1994 PA (Reference 1). The population distribution around the site is summarized in Table 7-1.

7.3.4 Sensitive Environments

Terrestrial sensitive environments include national parks and preserves, federal wilderness areas, terrestrial habitats for federal- and state-designated endangered or threatened species, and other national- and state-designated areas important to the maintenance of unique biotic communities. No terrestrial sensitive environments were identified within areas of soil contamination.

7.3.5 Resources

Resources associated with the soil exposure pathway may include commercial agriculture, commercial silviculture, commercial livestock production or grazing, and major or designated recreational areas. No resources have been identified in areas of observed contamination.

7.4 SOIL EXPOSURE CONCLUSIONS

WESTON collected a total of 11 soil samples from various areas on site and from off-site locations in order to characterize contaminant levels in site soils. The following conclusions can be drawn from the soil data from these samples:

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- As discussed in Section 4, a number of areas at the Wilcox site were identified as areas of soil having concentrations of site-related constituents at concentrations greater than three times maximum background levels. Both inorganic and organic constituents were detected; these include TPH, lead, mercury, zinc, acetone, and semivolatile organics.

- The area of contaminated soils associated with residences could not be adequately determined based on the one or two sample locations; however, the presence of hazardous substances has been established and determined to be attributable to the site.

- Five people live in areas of soil contamination related to the Wilcox site. A nearby population has been established for the site. No resources or terrestrial sensitive environments have been identified for the site.

- The areas of soil contamination occur in fenced sections of the site (corresponding to property divisions). However, children frequently trespass in the eastern portion of the site, where areas of contaminated soil and wastes exist. These areas may therefore pose a potential threat to human health.

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TABLE 7-1
NEARBY POPULATION

DISTANCE INTERVAL (miles)	ESTIMATED POPULATION	REFERENCE
On-Site	5	1, 2
0 to ¼	57	1, 2
¼ to ½	495	1
½ to 1	1,836	1

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SECTION 8
AIR PATHWAY

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The discussion in this section of the report focuses on the air pathway, another potential route of hazardous substance migration from the site. Atmospheric conditions, the likelihood of release to air, and potential air pathway targets are identified below.

8.1 METEOROLOGICAL INFORMATION

The prevailing wind direction changes seasonally; wind roses are provided in Reference 23. Information concerning rainfall in the region is presented in Subsection 5.2.3 of this report.

8.2 LIKELIHOOD OF RELEASE

Information concerning the likelihood of a release to the air pathway is presented in this subsection.

8.2.1 Air Sampling Results from Previous Investigations

No analytical data for the air pathway are known to exist.

8.2.2 ESI Air Quality Sampling and Analytical Results

Quantitative air sampling was not completed as part of the ESI. However, WESTON did perform air monitoring of the breathing zone during the site reconnaissance and sampling visit using an organic vapor analyzer (OVA) and miniature Realtime Aerosol Meter (mini-RAM). The mini-RAM was used to monitor for particulate concentrations in the air. Conditions requiring an upgrade in the level of personal protective equipment were not encountered by the field team. No sustained particulate concentrations or organic vapor readings above background levels were encountered in the breathing zone during site activities (Reference 1). However, elevated OVA readings were detected in sample holes where wastes were disturbed.

8.3 AIR PATHWAY TARGETS

The population, resources, and sensitive environments within 4 miles of the site are potential targets of a release of hazardous constituents to the air pathway. The targets identified for the air pathway are discussed in the following sections.

8.3.1 Population Within 4 Miles

Using GEMS, 1990 Census data, and a house count performed during the 1994 PA, the population residing within approximately 4 miles of the site was estimated (Reference 1). This population is summarized in Table 8-1.

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8.3.2 Sensitive Environments

No sensitive environments have been identified on-site (Reference 1).

8.3.3 Resources

Resources associated with the air migration pathway may include commercial agriculture, commercial silviculture, and major or designated recreational areas within ½ mile of a source at the site. No resources have been identified on or near the site (Reference 1).

8.4 AIR PATHWAY CONCLUSIONS

No releases of hazardous substances to the air pathway have been documented and the site is inactive. The nearby population is small. However, a release to the air pathway is of some concern since numerous sources exist on site, five people live near documented areas of soil contamination, and trespassing children have been seen playing in and near areas of documented contamination.

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TABLE 8-1
POPULATION WITHIN 4 MILES

DISTANCE INTERVAL (miles)	ESTIMATED POPULATION	REFERENCES
On-Site	5	2, 11
0 to ¼	57	1, 2, 11
¼ to ½	495	1
½ to 1	1,836	1
1 to 2	2,691	1
2 to 3	1,017	1
3 to 4	517	1

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SECTION 9
CONCLUSIONS

The Wilcox site is located on the north side of the City of Bristow, Creek County, Oklahoma. The site covers approximately 98 acres and is the location of an inactive oil refinery and tank farm. Refining began at the site during the 1920s and ended in the 1960s. The site is also bordered on the northwest and west by former refineries. The site includes remnants of an inactive refinery, pits, ponds, and a number of circular berms that surround tank bottoms. High concentrations of metals, volatile and semivolatile organic compounds, and TPH have been detected in on-site sources.

Concerns associated with the migration and exposure pathways are summarized as follows:

- As discussed in Section 5, a release to the groundwater pathway has not been documented but is of major concern. No groundwater samples were collected as part of this ESI. The population immediately north of the site are on private wells that produce from a shallow aquifer. In addition, the site overlies a potential recharge zone for an aquifer that is used for public drinking water supply.

- As discussed in Section 6, a release to the surface water pathway has been documented. Elevated levels of copper and lead have been detected in sediment samples collected from Sand Creek. Sand Creek and Little Deep Fork Creek are used for limited recreational fishing. Downstream of documented contamination are wetlands frontages in Sand Creek and Little Deep Fork Creek.

- As discussed in Section 7, elevated concentrations of inorganic and organic constituents have been documented in the surface soils on-site. A resident population of five has been established for the site. Although the site is not used for recreational activities, children frequently trespass in areas of soil contamination. No one works on the site.

- As discussed in Section 8, a release to the air pathway has not been documented. The site is inactive and the nearby population is low. However, five people live on-site near sources of hazardous substances, and children frequently trespass in areas of documented contamination.

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SECTION 10
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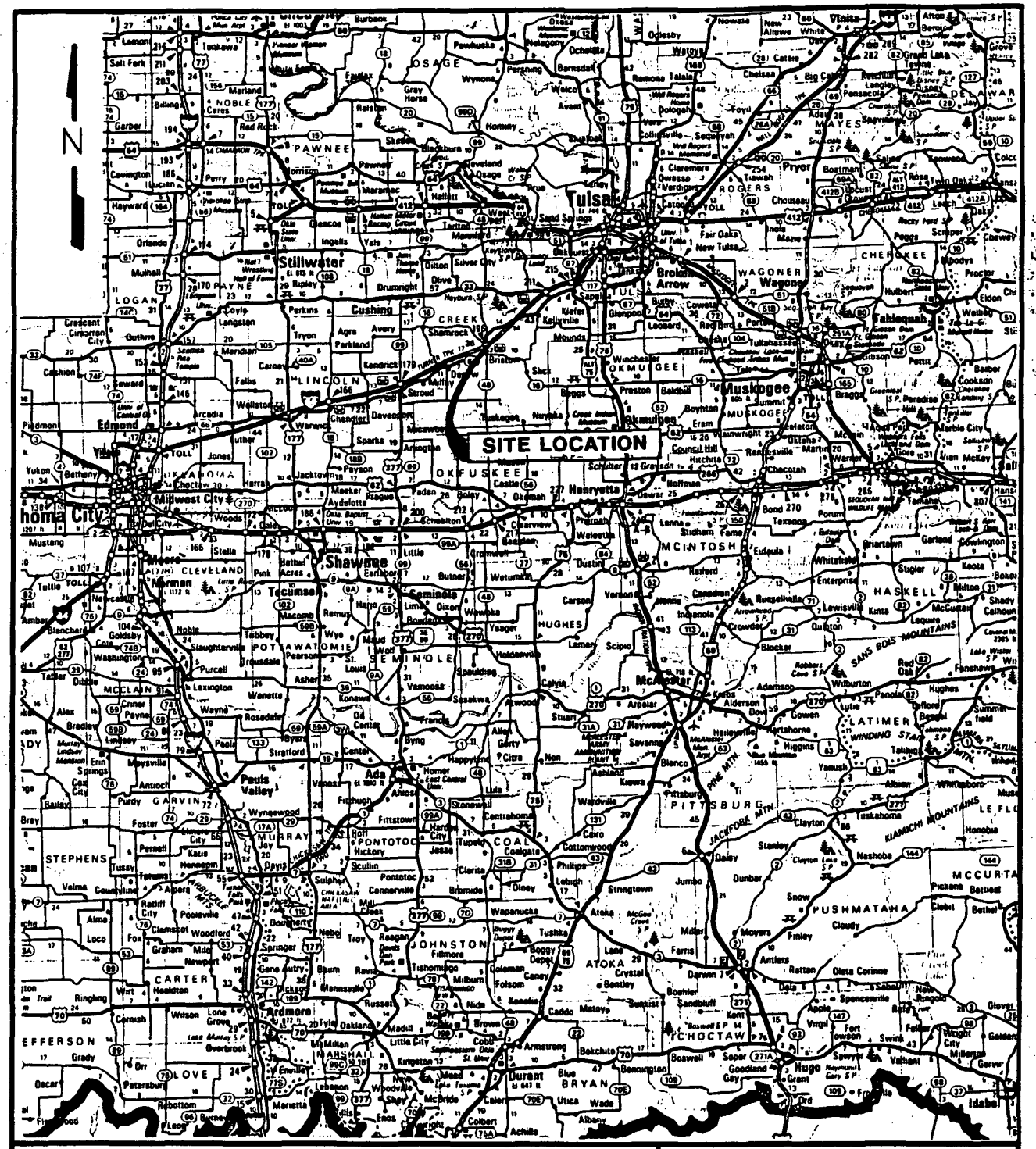
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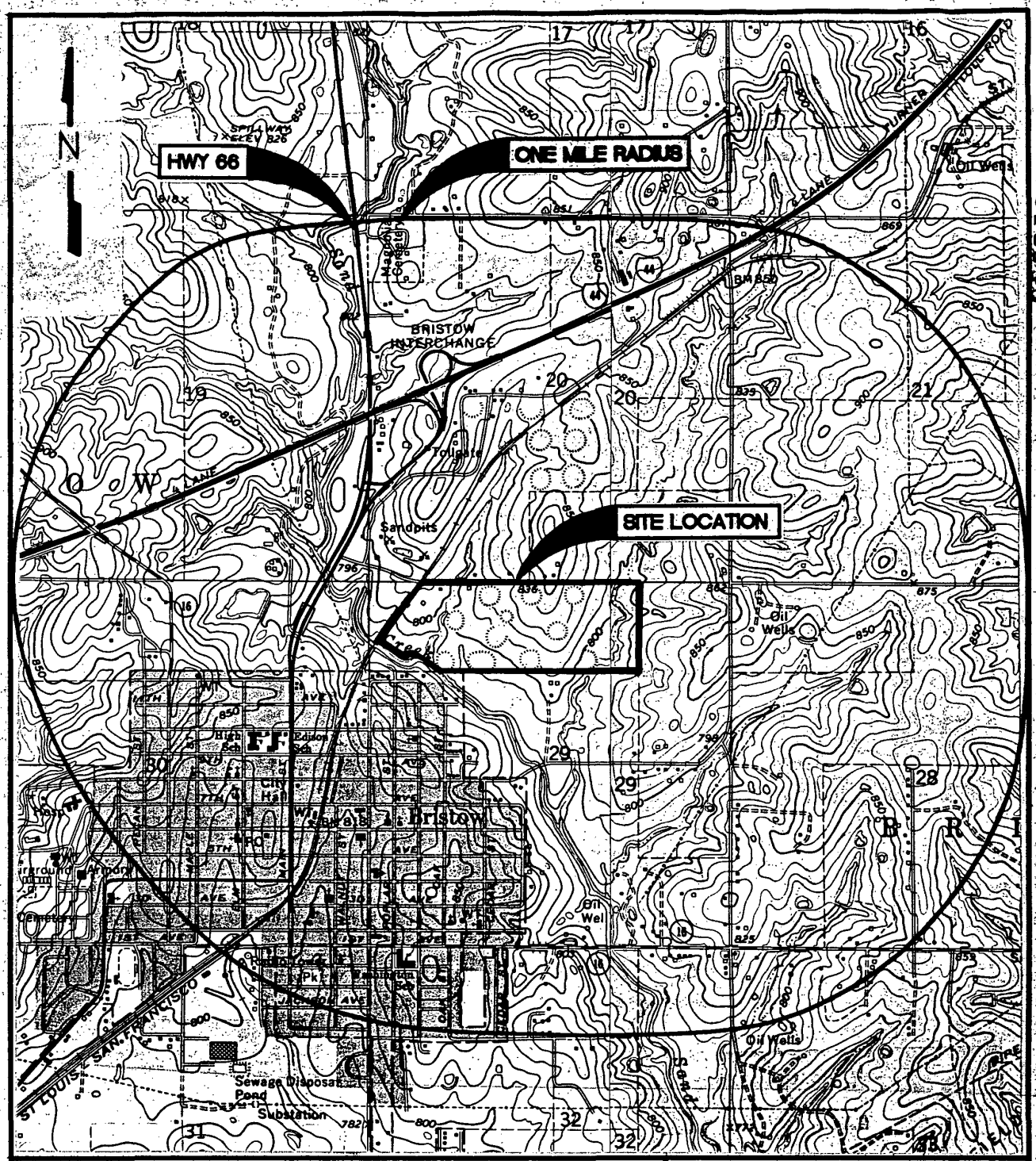
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APPENDICES

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N
SITE LOCATION
Tulsa
Stillwater
Muskogee
Bartlesville
Broken Arrow
Owasso
Sand Springs
Jenks
Bixby
Glenpool
Okmulgee
Henryetta
Sapulpa
Kiefer
Mounds
Drumright
Cushing
Perkins
Yale
Edmond
Oklahoma City
Midwest City
Del City
Shawnee
Norman
Moore
Tecumseh
Seminole
Wewoka
Holdenville
McAlester
Ada
Pauls Valley
Ardmore
Durant
Hugo
Poteau
Idabel
Wilburton
Talihina
Antlers
Atoka
Coalgate
Stonewall
Konawa
Purcell
Chickasha
Duncan
Marlow
Lawton
Elgin
Frederick
Altus
Hobart
Clinton
Weatherford
Elk City
Sayre
Cordell
Anadarko
Hinton
Watonga
Kingfisher
Guthrie
Enid
Ponca City
Blackwell
Tonkawa
Perry
Cushing
Pawhuska
Bartlesville
Nowata
Vinita
Miami
Grove
Jay
Afton
Claremore
Pryor
Chouteau
Locust Grove
Salina
Wagoner
Coweta
Fair Oaks
New Tulsa
Keystone
Oilton
Berryhill
Kellyville
Bristow
Depew
Stroud
Davenport
Chandler
Luther
Warwick
Arcadia
Edmond
Piedmont
Crescent
Cimarron City
Guthrie
Langston
Coyle
Perkins
Cushing
Drumright
Yale
Bristow
Kellyville
Mounds
Sapulpa
Glenpool
Jenks
Bixby
Broken Arrow
Owasso



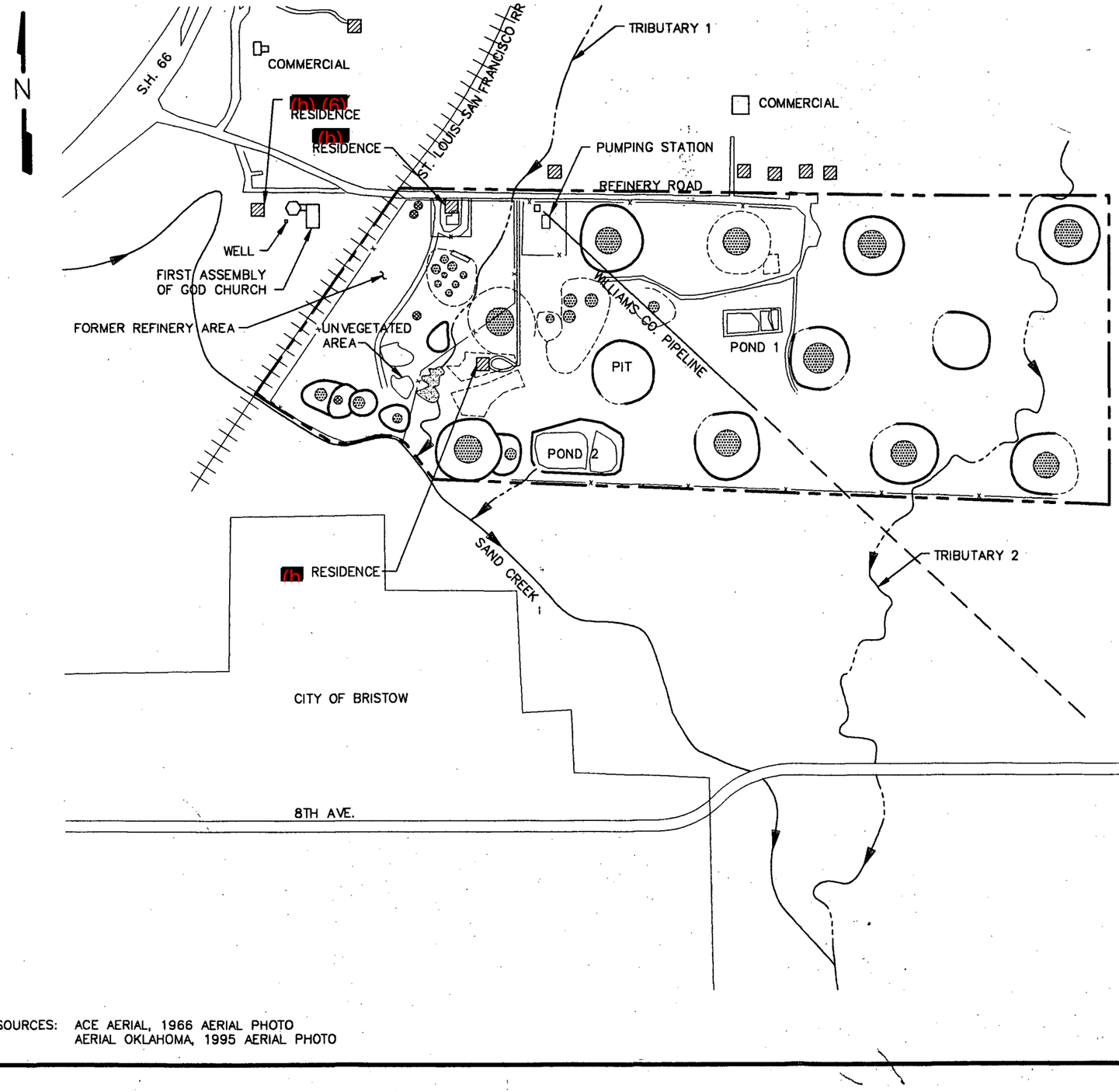
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FIGURE 2-1
SITE AREA MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION
W.O. NO.: 04606-056-028-0600

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LEGEND

- CUT/LEVELED BERM
- FENCE
- RESIDENCE
- ABOVE GROUND TANK
- BERM
- FORMER LOCATION OF TANK
- SITE BOUNDARY
- POND

0 250 500
SCALE IN FEET

SOURCES: ACE AERIAL, 1966 AERIAL PHOTO
AERIAL OKLAHOMA, 1995 AERIAL PHOTO

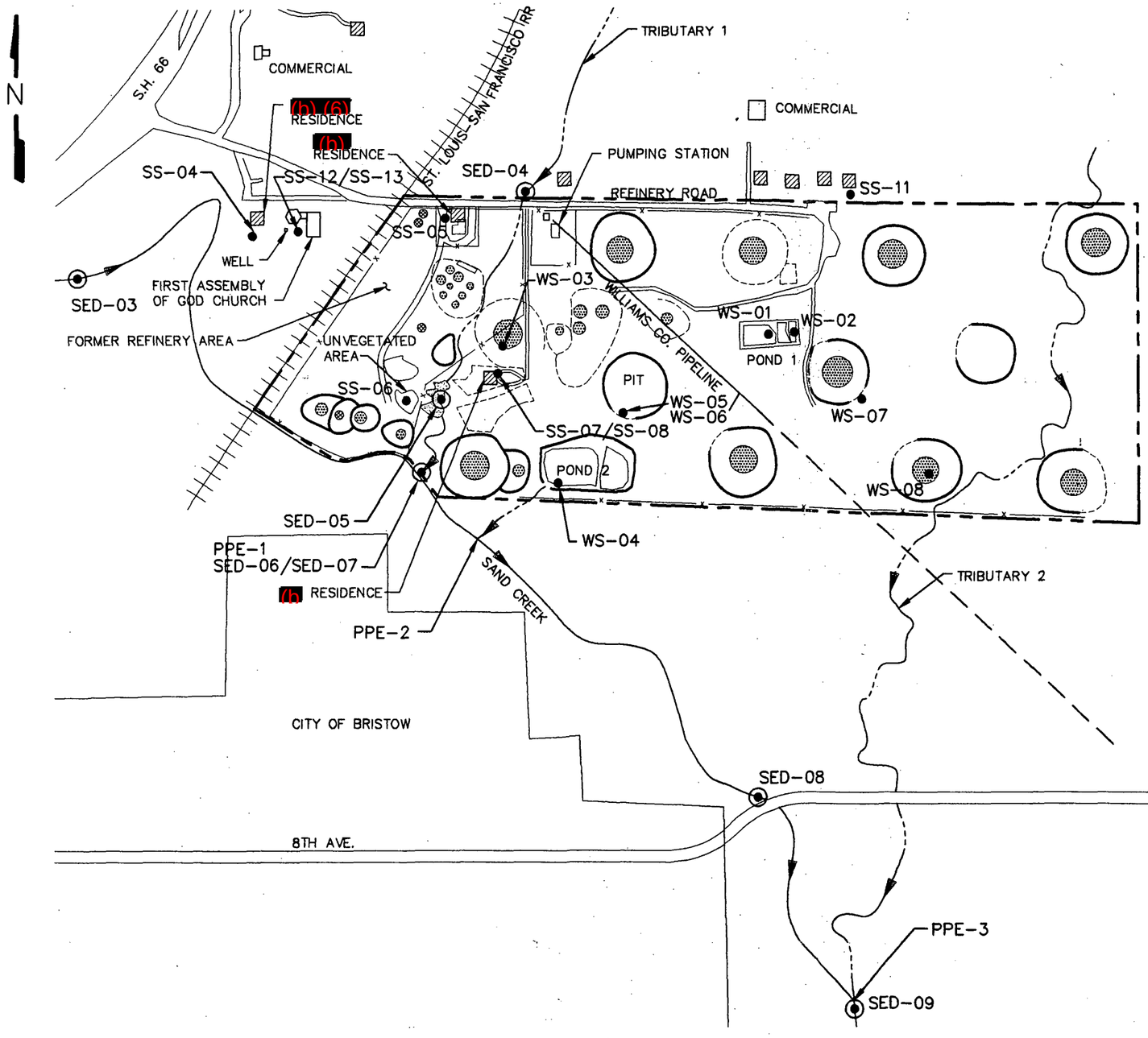
WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 2-2
SITE PLAN
WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917
EPA REGION VI
ARCS EXPANDED SITE INSPECTION
W.O. NO.: 04606-056-026-0600

H:\ARCS\ARC4606\0600A.BF.JC 1=500 (PCP=COLOR) 3-24-97

NOTE: SAMPLE LOCATIONS SHOWN ON FIGURE 3-2:

SS-01	SED-01
SS-02	SED-02
SS-03	SED-10



LEGEND

- CUT/LEVELED BERM
- FENCE
- RESIDENCE
- ABOVE GROUND TANK
- BERM
- FORMER LOCATION OF TANK
- SITE BOUNDARY
- SS-00 SOIL SAMPLE
- SED-00 SEDIMENT SAMPLE
- POND

0 250 500
SCALE IN FEET

SOURCES: ACE AERIAL, 1966 AERIAL PHOTO
AERIAL OKLAHOMA, 1995 AERIAL PHOTO

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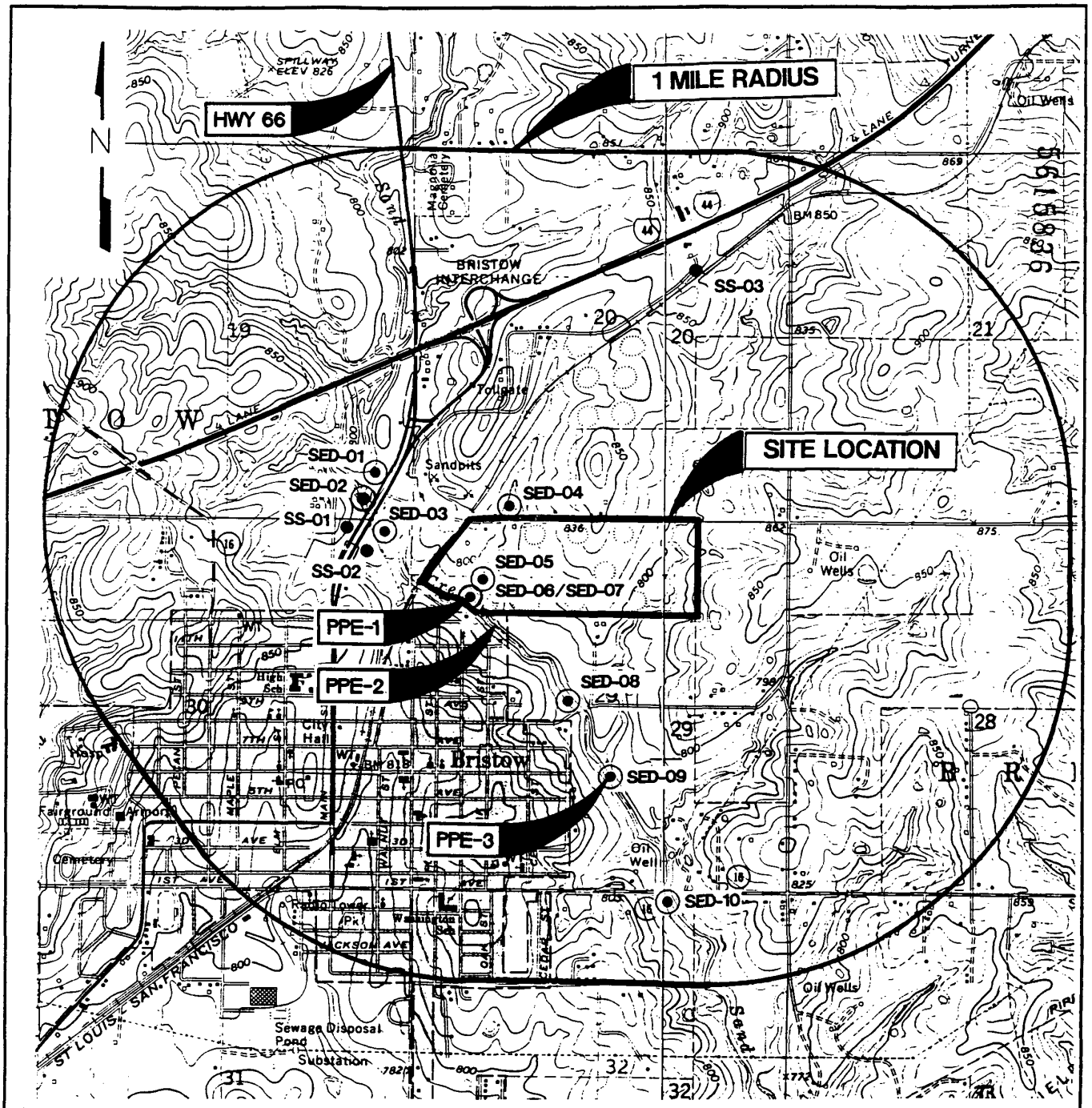
FIGURE 3-1
SAMPLE LOCATION MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

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BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW QUADRANGLE
SLICK QUADRANGLE
OKLAHOMA
7.5 MINUTE SERIES (TOPOGRAPHIC)
1973 SERIES

LEGEND

SED-01 SEDIMENT SAMPLE LOCATION

SS-01 SOIL SAMPLE LOCATION

0 1000 2000
SCALE IN FEET

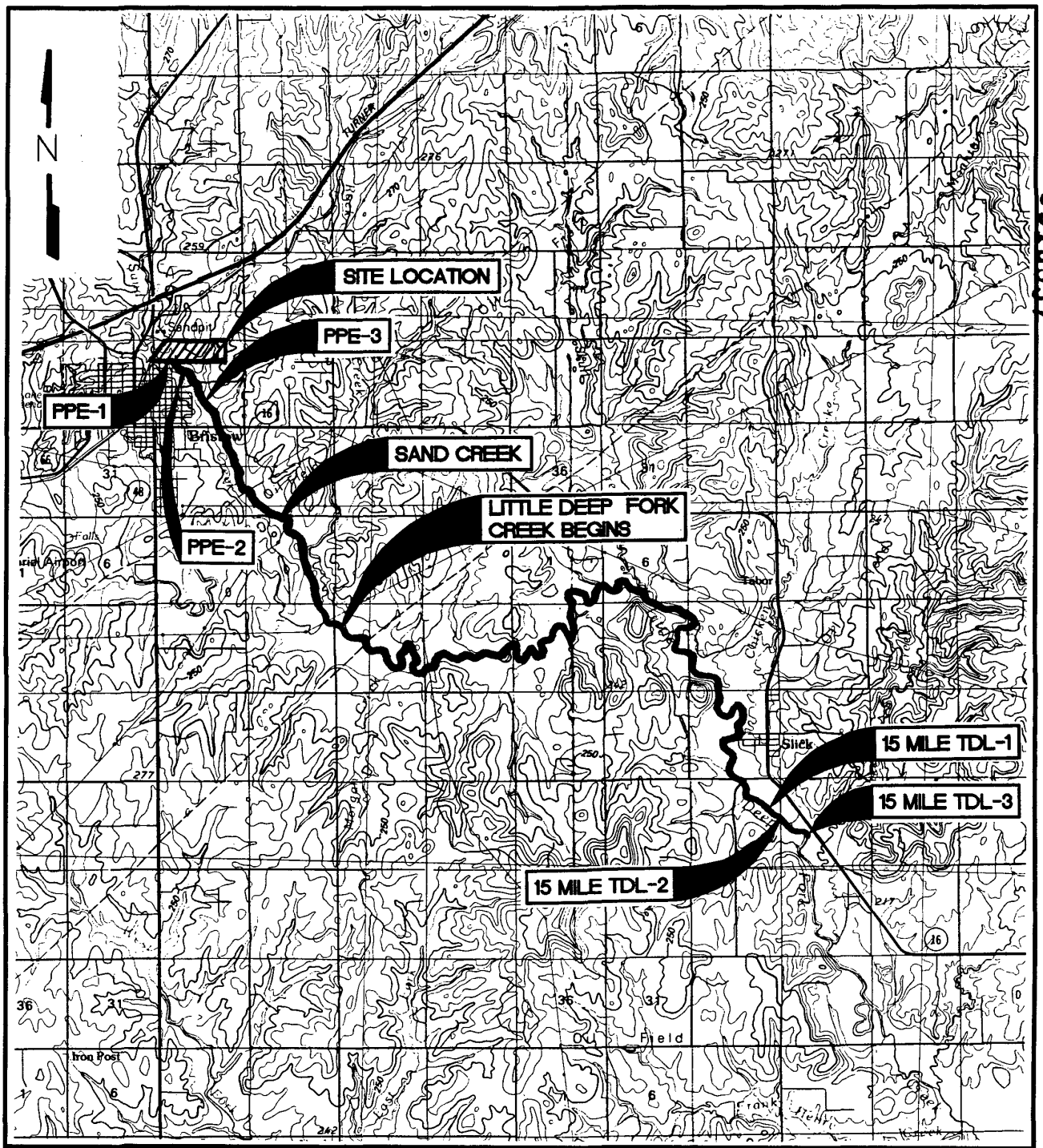
WESTON MANAGERS DESIGNERS/CONSULTANTS

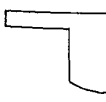
FIGURE 3-2
AREA SAMPLE LOCATION MAP
WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

561537





BASE MAP FROM:
U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
BRISTOW, OKLAHOMA
30 x 60 MINUTE SERIES (TOPOGRAPHIC)
1983 SERIES
SCALE 1:100,000

0 5000 10,000
SCALE IN FEET

WESTON
MANAGERS DESIGNERS/CONSULTANTS

FIGURE 6-1
SURFACE WATER PATHWAY MAP

WILCOX OIL COMPANY
BRISTOW, OKLAHOMA
CERCLA ID NO.: OKD001010917

EPA REGION VI
ARCS EXPANDED SITE INSPECTION

W.O. NO.: 04606-056-026-0600

H:\ARCS\ARC4606\0602.JC 1=500 (PCP=COLOR) 2-20-97

5615839

APPENDIX B

DATA PACKAGE EXCERPTS

FILE COPY
TYPE FILE PF RGW
NAME OR W.O. NO. 04606-056-026-0600
FILE INDEX NO. OR OTHER 19.0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

5615840

MEMORANDUM

Date: 1-24-1997

Subject: **Contract Laboratory Program Data Review**

From: Melvin L. Ritter, ESAT RPO, 6MD-HC M. Humphrey for

To: L. Biasco , 6SF-RA

Site: WILCOX OIL

Case#: 25159

SDG#: MFG-Z66

The EPA Region 6 Houston Branch ESAT data validation team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review and assessment report for this case.

The data package was found to be:

( ) Acceptable: No major problems with data package.

(X) Provisional: Use of data requires caution.
Data is acceptable for Regional use. Problems are noted in the review report.

( ) Unacceptable: Some or all of data should not be used.
Problems are noted in the review report.

Questions regarding the data review report can be addressed to me.

Attachments

cc: R. Flores, Region 6 CLP/TPO
M. El-feky, Region 6 Data Coordinator

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LOCKHEED MARTIN SERVICES GROUP
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HOUSTON, TEXAS 77074

5615841

MEMORANDUM

DATE: January 17, 1997

TO: Dr. Melvin Ritter, ESAT RPO, Region VI

FROM: Dr. Tom C.H. Chiang, ESAT ETM, Region VI

SUBJECT: CLP Data Review

REF: TDF # 6-7129A ESAT File # I2077

Attached is the data review summary for Case #25159
SDG #MFGZ66
Site WILCOX OIL

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF DATA PACKAGE:

A. The hard copy data review confirmed the following contractual noncompliance found by CCS.

- The laboratory performed the cyanide matrix spike analysis with the wrong cyanide spike concentration (SOW ILM04.0, page E-23, Table 3). The reviewer determined the wrong cyanide spike concentration did not affect the technical usability of the sample results.

B. The hard copy data review detected the following contractual noncompliances not found by CCS.

1. The data package was received at the Region nine days late for the required 35-day turnaround time.

2. The laboratory did not seal the sample tag in a plastic bag (SOW ILM04.0, page B-13, F.3.d).

II. TECHNICAL/USABILITY ASSESSMENT OF DATA PACKAGE:

A total of 24 results were reviewed for this data package. The data package is technically provisional because of the following problems.

000645

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10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TEXAS 77074

5615842

MEMORANDUM

Attached is the data review summary for Case #25159
SDG #MFGZ66
Site WILCOX OIL

II. TECHNICAL/USABILITY ASSESSMENT OF DATA PACKAGE, continued:

A. Approximately eight percent of all results were qualified because of technical problems.

B. The matrix spike recoveries were below the QC limits for antimony and lead.

C. The difference between lead laboratory duplicate results exceeded the QC limit.

000646

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6 - HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

5615843

CASE NO. 25159
LABORATORY ARI
CONTRACT # 68-D5-0134
SDG # MFGZ66
SOW# ILM04.0
ACCT # 7FAXJN28 SF # FAXUZZ

SITE WILCOX OIL
NO. OF SAMPLES 1
MATRIX SOIL
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Mervin Doucet
COMPLETION DATE January 17, 1997

SAMPLE NO.: MFG-Z66

DATA ASSESSMENT SUMMARY

	ICP	HG	Cyanide	GFAA
1. HOLDING TIMES	O	O	O	O
2. CALIBRATIONS	O	O	O	O
3. BLANKS	O	O	O	O
4. MATRIX SPIKES	M	O	O	M
5. DUPLICATE ANALYSIS	O	O	O	M
6. ICP QC	O			
7. FAA QC				O
8. LCS	O	O	O	O
9. SAMPLE VERIFICATION	O	O	O	O
10. OTHER QC	N/A	N/A	N/A	N/A
11. OVERALL ASSESSMENT	M	O	O	M

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
N/A = Not applicable

ACTION ITEMS: The sample tag was not sealed in a plastic bag. The laboratory returned the data package to the Region nine days late.

AREAS OF CONCERN: The matrix spike recoveries were less than 75 percent for antimony and lead. The lead laboratory duplicate difference failed QC criteria. The laboratory used the wrong cyanide spike concentration to perform cyanide matrix spike analysis.

NOTABLE PERFORMANCE:

000647

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 25159 SDG MFGZ66 Site WILCOX OIL Lab ARI

COMMENTS: The package consisted of data for one soil sample for total metals and cyanide analysis by ILM04.0. The laboratory failed to meet the required 35-day data package turnaround time and did not place the sample tag in a sealed plastic bag. The laboratory also performed the cyanide matrix spike analysis with an incorrect spike concentration. Twenty-five percent of the reported results are above the CRDL's.

This data package is technically provisional because of problems with matrix spike recoveries and a laboratory duplicate difference. The technical usability of all reported sample results is appropriately indicated by ESAT's final data qualifiers in the attached Data Summary Sheet.

An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the Evidence Inventory Checklist is attached to this report.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL AND TECHNICAL ISSUES. THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS.

1. **Holding Times:** Acceptable. All holding time and sample preservation criteria were met.

2. **Calibrations:** Acceptable. All calibrations were acceptable. Analysis of CRDL standards indicated that instrument performance near the CRDL's was acceptable.

3. **Blanks:** Acceptable. All preparation and calibration blanks met contractual requirements although concentrations for six analytes were reported in the blanks. The potassium result was below the CRDL and affected by the preparation blank concentration.

4. **Pre-digestion/Pre-distillation Matrix Spike Recovery:** Provisional. The results for antimony and lead were qualified as estimated with a low bias because the matrix spike recoveries failed QC criteria.

5. **Duplicate Analysis:** Provisional. The lead laboratory duplicate difference failed technical QC criteria, so the lead result was qualified as estimated.

000648

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 25159 SDG MFGZ66 Site WILCOX OIL Lab ARI

5615845

6. **ICP Quality Control:**

Serial Dilution: Acceptable. All serial dilution differences met QC criteria.

Interference Check Sample: Acceptable. All ICS results were acceptable indicating correct interelement and background correction.

ICP Coefficient of Variation: Acceptable. All ICP replicate readings were consistent.

7. **Furnace Atomic Absorption Quality Control:**

FAA Analytical Spike Recovery: Acceptable. All FAA analytical spike recovery were acceptable.

FAA Duplicate Injection Relative Standard Deviation: Acceptable. All percent relative standard deviations (%RSD) for duplicate injections were acceptable.

Method of Standard Addition: Acceptable. All MSA's had acceptable correlation coefficients.

8. **Laboratory Control Sample:** Acceptable. All LCS recoveries were within the QC limits.

9. **Sample Verification:** The reviewer could not verify all reporting errors found by CCS. The reviewer did detect some reporting errors not found by CCS and contacted the laboratory concerning these issues (see attached FAX Record Log).

10. **Other QC:** Not applicable.

11. **Overall Assessment:** The data package is technically provisional because of the following problems.

The antimony and lead results were qualified because the matrix spike recoveries were below the QC limits.

The lead result was further qualified because the difference between laboratory duplicate results failed QC criteria.

000649

INORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the inorganic data review process.

U	Undetected at the laboratory reported detection limit (IDL).
L	Reported concentration is between the IDL and the CRDL.
J	Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, FAA spike recovery, etc.
R	Result is unusable.
F	A possibility of a false negative exists.
UC	Reported concentration should be used as a raised detection limit because of apparent blank contamination.
^	High bias. Actual concentration may be lower than the concentration reported.
v	Low bias. Actual concentration may be higher than the concentration reported.

SDMS DOCID 515846

DATA SUMMARY

Case No.: 25159 SDG. No.: MFGZ66 Reviewer: M. Doucet

Laboratory: ARI Matrix: SOIL Units: mg/Kg

EPA TR #=>	SED-10 MFG-Z66	FLAG	FLAG	FLAG	FLAG	FLAG	COMMENTS
ALUMINUM	1570						
ANTIMONY	10.9	UJv					
ARSENIC	1	L					
BARIUM	15.8	L					
BERYLLIUM	0.22	U					
CADMIUM	0.44	U					
CALCIUM	382	L					
CHROMIUM	3.7						
COBALT	2.1	L					
COPPER	1.9	L					
IRON	3350						
LEAD	15	Jv					
MAGNESIUM	254	L					
MANGANESE	62.3						
MERCURY	0.05	U					
NICKEL	2.2	U					
POTASSIUM	396	LUC					
SELENIUM	0.22	U					
SILVER	0.65	U					
SODIUM	10.9	U					
THALLIUM	0.22	U					
VANADIUM	5.3	L					
ZINC	8.7						
CYANIDE	0.27	U					
% SOLIDS	90.7						

5615847

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 25159 SDG No. MFGZ66 SDG Nos. To Follow SAS No. Date Rec 1/3/97

EPA Lab ID: ARI

Lab Location: SEATTLE, WA

Region: 6 Audit No.: 25159/MFGZ66

Re_Submitted CSF? Yes _____ No X

Box No(s): 1

COMMENTS:

14/15. The airbill did not require receipt signature and date.

SDG 25159 MFGZ66

ORIGINALS	YES	NO	N/A
CUSTODY SEALS 1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2 3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1 6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s) 9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s) 11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER 13. Present?	X		
14. Signed?			X
15. Dated?			X
SAMPLE TAGS 16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS 18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Over for additional comments.

Audited by: Mervin S Doucet MERVIN DOUCET/ESAT DATA REVIEWER Date 1/7/96

Audited by: _____ _____ Date _____

Audited by: _____ _____ Date _____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____

Entered by: _____ _____

Reviewed by: _____ _____

Signature Printed Name/Title

DC-2___

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

561584

Date of FAX: January 17, 1997

Laboratory Name: ARI

Lab Contact: Paul Jay Kuhn

Region: 6

Regional Contact: Mervin Doucet (ESAT)

FAX Initiated by: Region

In reference to data for the following sample number:

MFG-Z66

Summary of Questions/Issues:

1. The sample tag was not sealed in a plastic bag (SOW ILM04.0, page B-13, F.3.d). Please submit an acknowledgement of this contractual deviation and note for future reference.

2. According to the raw data (page 271), the selenium analysis time on the Form 14 (page 53) for sample MFG-Z66 should be 15:33. Please resubmit the corrected Form 14.

3. According to the raw data (page 286), the mercury analysis times for most standards do not match the analysis times on the Form 14 (page 55). Please make the necessary corrections and resubmit.

4. According to the raw data (pages 80-84), the ICP analysis times for all standards do not match the analysis times on the Form 14 (page 53). Please make the necessary corrections and resubmit.

EPA expects the laboratory to look into items and submit data within seven days to Mahmoud El-Feky, U.S. EPA, 10625 Fallstone Road, Houston TX 77099.

Mervin L Doucet
Signature

1/17/97
Date

Distribution: (1) Lab Copy (2) Region Copy

Lockheed Martin Services Group
ESAT Region 6

One Sterling Plaza, 10101 Southwest Freeway, Suite 500
Houston, TX 77074 TEL:(713) 988-2959

561 9350

FACSIMILE COVER SHEET

Please deliver the following pages to:

Name Paul Jay Kuhn

Firm ARI

City Seattle **State** WA

Telephone 206-621-6490 **Ext.** _____

Fax Telephone No. 206-621-7523 **Ext.** _____

Sender:

Name Mervin Doucet ESAT

Date January 17, 1997 **Time** _____

Total Number of pages including this Cover Sheet 2

If you do not receive all the pages or if any pages are unclear, please call: (713) 988-2959

MESSAGES: _____

Fax No. (713) 988-2994

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

5615851

MEMORANDUM

Date: 1-16-1997

Subject: **Contract Laboratory Program Data Review**

From: M. Humphreys for Melvin L. Ritter, ESAT RPO, 6MD-HC

To: L. Biasco , 6SF-RA

Site: WILCOX OIL

Case#: 25159

SDG#: MFG-Z44

The EPA Region 6 Houston Branch ESAT data validation team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review and assessment report for this case.

The data package was found to be:

( ) Acceptable: No major problems with data package.

(X) Provisional: Use of data requires caution.
Data is acceptable for Regional use. Problems are noted in the review report.

( ) Unacceptable: Some or all of data should not be used.
Problems are noted in the review report.

Questions regarding the data review report can be addressed to me.

Attachments

cc: R. Flores, Region 6 CLP/TPO
M. El-feky, Region 6 Data Coordinator

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LOCKHEED MARTIN SERVICES GROUP
10101 SOUTHWEST FREEWAY, SUITE 500
HOUSTON, TEXAS 77074

5615852

MEMORANDUM

DATE: January 7, 1997

TO: Dr. Melvin Ritter, ESAT RPO, Region VI

FROM: Dr. Tom Chiang, ESAT ETM, Region VI

SUBJECT: CLP Data Review

REF: TDF # 6-7111A, ESAT File No. I2073

Attached is the data review summary for Case #25159
SDG #MFGZ44
Site WILCOX OIL

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF DATA PACKAGE:

The reviewer detected the following contractual noncompliance. The CCS report was not available at the time of this report preparation.

The laboratory failed to encase the sample tags in a clear plastic bag (ILM04.0, Exhibit F, F-13).

II. TECHNICAL/USABILITY ASSESSMENT OF DATA PACKAGE:

A total of 480 results were reviewed for this data package. The package is technically provisional for the problems summarized below.

A. The reviewer qualified approximately nine percent of the results because of technical problems.

B. The antimony matrix spike recovery failed to meet QC criteria.

C. Four selenium analyses failed FAA QC criteria.

D. Lead field duplicate results were inconsistent.

000656

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

561853

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 25159 SITE WILCOX OIL
LABORATORY ARI NO. OF SAMPLES 20
CONTRACT # 68-D5-0134 MATRIX SOIL
SDG # MFGZ44 REVIEWER (IF NOT ESD) ESAT
SOW# ILM04.0 REVIEWER'S NAME Linda Hoffman
ACCT # 7FAXJN28 SF # FAXUZZ COMPLETION DATE January 7, 1997

SAMPLE NO.:					
	MFG-Z44	MFG-Z48	MFG-Z52	MFG-Z56	MFG-Z60
	MFG-Z45	MFG-Z49	MFG-Z53	MFG-Z57	MFG-Z63
	MFG-Z46	MFG-Z50	MFG-Z54	MFG-Z58	MFG-Z64
	MFG-Z47	MFG-Z51	MFG-Z55	MFG-Z59	MFG-Z65

DATA ASSESSMENT SUMMARY

	ICP	FAA	HG	CYANIDE
1. HOLDING TIMES	O	O	O	O
2. CALIBRATIONS	O	O	O	O
3. BLANKS	O	O	O	O
4. MATRIX SPIKES	M	O	O	O
5. DUPLICATE ANALYSIS	O	O	O	O
6. ICP QC	M			
7. FAA QC		M		
8. LCS	O	O	O	O
9. SAMPLE VERIFICATION	O	O	O	O
10. OTHER QC	O	M	O	O
11. OVERALL ASSESSMENT	M	M	O	O

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
N/A= Not applicable

ACTION ITEMS: The sample tags were not encased in the required plastic bags.

AREAS OF CONCERN: The matrix spike recovery for antimony was less than 75 percent. Four selenium analyses had FAA analytical spike recoveries below 85 percent. The lead field duplicate results were inconsistent. One nickel analysis had a correlation coefficient greater than 20 percent.

NOTABLE PERFORMANCE:

000657

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 25159 SDG MFGZ44 Site WILCOX OIL Lab ARI

COMMENTS: The package consisted of data for 20 soil samples for total metals and cyanide analyses by ILM04.0. The sampler designated samples MFG-Z49/MFG-Z50, MFG-Z59/MFG-Z60, and MFG-Z65/MFG-Z65 as field duplicate pairs and sample MFG-Z44 as the QC sample. The laboratory met the 35-day turnaround time requirement but did not enclose the sample tags in plastic bags. Thirty-two percent of the reported results were above the CRDL's.

The laboratory incorrectly reported the lead results ,which was 55,000 mg/Kg, for sample MFG-Z58. On the Data Summary Table, the reviewer recorded the correct concentration.

The data package is technically provisional because of problems with matrix and FAA analytical spike recoveries, field duplicate differences, and inconsistent instrument readings. The technical usability of all reported results is indicated in the attached Data Summary Table.

An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the Evidence Inventory Checklist is attached to this report.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL AND TECHNICAL ISSUES. THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS.

1. **Holding Times:** Acceptable. Contractual holding time and sample preservation criteria were met. Technical holding time criteria have not been established for soil samples.

2. **Calibrations:** Acceptable. All calibrations met contractual requirements. The CRDL standard results indicated that instrument performance near the CRDL's was acceptable.

3. **Blanks:** Acceptable. Preparation and calibration blanks met contractual requirements although the laboratory reported calcium, copper, vanadium, and zinc in the blanks. The copper and vanadium blank concentrations only affected sample results below the CRDL's. The following zinc results were above the CRDL's and affected as indicated by the blanks.

   The results for samples MFG-Z44, MFG-Z49, and MFG-Z50 are high biased.

000658

5615855

3. **Blanks, continued:**

The results for samples MFG-Z45 and MFG-Z52 are considered undetected.

4. **Pre-digestion/Pre-distillation Matrix Spike Recovery:** Provisional. The laboratory reported an antimony matrix spike recovery that was below the QC limit, so the reviewer qualified as estimated and biased low all antimony results.

5. **Duplicate Analysis:** Acceptable. The laboratory reported duplicate differences above the SOW QC limits for aluminum and iron. Since the aluminum difference was only marginally high and the iron difference met technical QC criteria, no results were qualified.

6. **ICP Quality Control:**

Serial Dilution: Acceptable. The laboratory reported acceptable serial dilution differences.

Interference Check Sample: Acceptable. Acceptable ICS results indicated satisfactory interelement and background correction.

Coefficient of Variation: Provisional. The reviewer qualified as estimated the nickel result for sample MFG-Z65 because replicate ICP readings were inconsistent.

7. **Furnace Atomic Absorption Quality Control:**

FAA Analytical Spike Recovery: Provisional. The reviewer qualified as estimated and biased low the selenium results for samples MFG-Z58, MFG-Z59, MFG-Z60, and MFG-Z64 because FAA QC criteria were not met. The reviewer did not qualify six other selenium and two thallium results because the analytical spike recoveries were only marginally below the QC limits.

Duplicate Injection Coefficient of Variation: Acceptable. Replicate injections were consistent.

Method of Standard Addition: MSA analysis was not required.

000659

8. **Laboratory Control Sample:** Acceptable. Acceptable LCS results indicated satisfactory sample preparation and analysis.

9. **Sample Verification:** The reviewer detected a few reporting errors and contacted the laboratory for resubmission (see attached FAX Record Log).

10. **Other QC:**

Field Duplicate: Provisional. The reviewer qualified all lead results because two of the three field duplicate pairs had inconsistent lead results.

11. **Overall Assessment:** The data package is technically provisional for the following reasons.

The reviewer qualified all antimony and four selenium results because of matrix related problems.

The reviewer qualified one nickel result because of inconsistent instrument readings.

The reviewer qualified all lead results because of poor precision.

000660

INORGANIC DATA QUALIFIER DEFINITIONS

5615857

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the inorganic data review process.

U Undetected at the laboratory reported detection limit (IDL).

L Reported concentration is between the IDL and the CRDL.

J Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, FAA spike recovery, etc.

R Result is unusable.

F A possibility of a false negative exists.

UC Reported concentration should be used as a raised detection limit because of apparent blank contamination.

^ High bias. Actual concentration may be lower than the concentration reported.

v Low bias. Actual concentration may be higher than the concentration reported.

DATA SUMMARY

Case No.: 25159 SDG. No.: MFGZ44 Reviewer: L. Hoffman

Laboratory: ARI Matrix: SOIL Units: mg/Kg

EPA TR #=>	SED01 MFG-Z44	FLAG	SED02 MFG-Z45	FLAG	SED03 MFG-Z46	FLAG	SED04 MFG-Z47	FLAG	SED05 MFG-Z48	FLAG	COMMENTS
ALUMINUM	2200		1400		2170		2550		1610		
ANTIMONY	12.2	UJv	11.5	UJv	12.4	UJv	12.1	UJv	12.4	UJv	
ARSENIC	1.3	L	0.93	L	2.1	L	3.9		0.90	L	
BARIUM	21.4	L	15.4	L	30.9	L	35.8	L	15.3	L	
BERYLLIUM	0.24	U	0.23	U	0.25	U	0.24	U	0.25	U	
CADMIUM	0.49	U	0.46	U	0.50	U	0.48	U	0.50	U	
CALCIUM	406	L	368	L	808	L	12600		576	L	
CHROMIUM	5.6		3.3		4.0		6.1		3.8		
COBALT	2.3	L	1.4	L	2.7	L	2.1	L	1.2	L	
COPPER	2.7	LUC	1.6	LUC	3.0	LJ^	5.5	L	2.9	L	
IRON	4340		2880		4870		5690		2630		
LEAD	6.0	J	4.0	J	33.9	J	117	J	54.0	J	
MAGNESIUM	333	L	247	L	425	L	6260		317	L	
MANGANESE	112		67.0		168		319		72.3		
MERCURY	0.05	U	0.05	U	0.05	U	0.05	U	0.06	U	
NICKEL	3.4	L	3.4	L	3.1	L	4.7	L	3.2	L	
POTASSIUM	373	L	190	L	362	L	436	L	284	L	
SELENIUM	0.24	U	0.23	U	0.25	U	0.24	U	0.24	U	
SILVER	0.73	U	0.69	U	0.74	U	0.73	U	0.74	U	
SODIUM	12.2	U	11.5	U	12.4	U	49.9	L	12.4	U	
THALLIUM	0.31	L	0.23	L	0.25	U	0.29	L	0.24	U	
VANADIUM	6.5	LJv	4.5	LJv	6.8	LJv	7.0	LJv	5.1	LJv	
ZINC	7.6	J^	6.2	UC	11.6		31.7		11.6		
CYANIDE	0.30	U	0.30	U	0.31	U	0.31	U	0.31	U	
% SOLIDS	81.9		82.7		80.0		81.8		80.0		

DATA SUMMARY

Case No.: 25159 SDG. No.: MFGZ44 Reviewer: L. Hoffman

Laboratory: ARI Matrix: SOIL Units: mg/Kg

5615859

EPA TR #=>	SED06 MFG-Z49	FLAG	SED-07 MFG-Z50	FLAG	SED-08 MFG-Z51	FLAG	SED-09 MFG-Z52	FLAG	SS-01 MFG-Z53	FLAG	COMMENTS
ALUMINUM	1850		1790		2720		1670		3630		
ANTIMONY	12.0	UJv	12.0	UJv	12.4	UJv	12.1	UJv	11.6	UJv	
ARSENIC	1.1	L	1.3	L	1.6	L	1.4	L	1.5	L	
BARIUM	21.8	L	24.0	L	32.7	L	15.4	L	46.6		
BERYLLIUM	0.24	U	0.24	U	0.25	U	0.24	U	0.23	U	
CADMIUM	0.48	U	0.48	U	0.50	U	0.48	U	0.68	L	
CALCIUM	557	L	628	L	859	L	315	L	1590		
CHROMIUM	2.8		2.9		4.6		4.0		5.7		
COBALT	1.6	L	1.9	L	2.6	L	1.6	L	2.4	L	
COPPER	1.8	LUC	1.7	LUC	3.0	L	1.5	L	5.2	L	
IRON	3400		3550		5000		3560		4850		
LEAD	5.0	J	15.8	J	18.4	J	4.6	J	26.3	J	
MAGNESIUM	324	L	337	L	465	L	228	L	577	L	
MANGANESE	93.1		113		X 284		73.0		191		
MERCURY	0.06	U	0.05	U	0.05	U	0.05	U	0.06	U	
NICKEL	3.8	L	3.6	L	4.3	L	2.4	U	5.3	L	
POTASSIUM	280	L	313	L	417	L	289	L	704	L	
SELENIUM	0.25	U	0.24	U	0.24	U	0.24	U	0.24	U	
SILVER	0.72	U	0.72	U	0.74	U	0.72	U	0.70	U	
SODIUM	12.0	U	12.0	U	12.4	U	12.1	U	11.6	U	
THALLIUM	0.25	U	0.24	L	0.24	U	0.24	U	0.26	L	
VANADIUM	4.9	LJv	5.0	LJv	6.6	LJv	5.5	LJv	9.7	L	
ZINC	8.0	J^	8.0	J^	21.7		6.0	UC	24.3		
CYANIDE	0.30	U	0.30	U	0.32	U	0.30	U	0.30	U	
% SOLIDS	81.6		82.5		77.6		82		93.4		

DATA SUMMARY

Case No.: 25159 SDG. No.: MFGZ44 Reviewer: L. Hoffman

Laboratory: ARI Matrix: SOIL Units: mg/Kg

EPA TR #=>	SS-02 MFG-Z54	FLAG	SS-03 MFG-Z55	FLAG	SS-04 MFG-Z56	FLAG	SS-05 MFG-Z57	FLAG	SS-06 MFG-Z58	FLAG	COMMENTS
ALUMINUM	5580		3550		3430		4060		9090		
ANTIMONY	11.0	UJv	12.5	UJv	12.2	UJv	11.5	UJv	12.7	UJv	
ARSENIC	1.3	L	1.5	L	1.3	L	2.3		1.5	L	
BARIUM	58.2		31.8	L	31.8	L	34.8	L	89.0		
BERYLLIUM	0.28	L	0.26	L	0.24	U	0.23	U	0.40	L	
CADMIUM	0.44	U	0.50	U	0.49	U	0.72	L	0.51	U	
CALCIUM	1510		516	L	947	L	1750		1240	L	
CHROMIUM	9.2		6.7		4.4		7.2		11.0		
COBALT	3.3	L	4.6	L	1.8	L	2.5	L	5.6	L	
COPPER	5.3	L	4.4	L	4.5	L	11.4		127		
IRON	6340		7430		4570		6910		11200		
LEAD	19.5	J	6.6	J	116	J	369	J	~~55000~~ 55049	J	
MAGNESIUM	693	L	744	L	423	L	774	L	1050	L	
MANGANESE	233		80.7		96.4		209		414		
MERCURY	0.05	U	0.06	U	0.05	U	0.18		0.06	U	
NICKEL	7.3	L	10.4		5.9	L	5.4	L	10.1		
POTASSIUM	961	L	840	L	480	L	680	L	1150	L	
SELENIUM	0.23	U	0.24	U	0.25	U	0.23	U	0.26	UJv	
SILVER	0.66	U	0.75	U	0.73	U	0.69	U	0.76	U	
SODIUM	20.5	L	17.7	L	17.8	L	14.2	L	2330		
THALLIUM	0.23	U	0.39	L	0.25	U	0.27	L	1.3	U	
VANADIUM	11.2		8.0	L	7.2	LJv	9.8	L	19.5		
ZINC	34.8		23.5		36.3		132		25.7		
CYANIDE	0.29	U	0.31	U	0.31	U	0.29	U	0.35	U	
% SOLIDS	85.4		79.8		79.1		86.1		72.4		

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DATA SUMMARY

Case No.: 25159 SDG. No.: MFGZ44 Reviewer: L. Hoffman

Laboratory: ARI Matrix: SOIL Units: mg/Kg

	SS-07	FLAG	SS-08	FLAG	SS-11	FLAG	SS-12	FLAG	SS-13	FLAG	COMMENTS
EPA TR #=>	MFG-Z59		MFG-Z60		MFG-Z63		MFG-Z64		MFG-Z65		
ALUMINUM	7060		5720		2000		5350		5110		
ANTIMONY	11.9	UJv	11.5	UJv	10.7	UJv	11.8	UJv	12.0	UJv	
ARSENIC	1.5	L	1.7	L	1.0	L	1.8	L	2.0	L	
BARIUM	54.6		52.6		35.7	L	47.6		46.2	L	
BERYLLIUM	0.31	L	0.23	U	0.21	U	0.25	L	0.24	U	
CADMIUM	0.47	U	0.46	U	0.43	U	0.47	U	0.48	U	
CALCIUM	2830		2810		767	L	4950		4540		
CHROMIUM	11.7		9.2		2.7		7.7		7.0		
COBALT	3.1	L	2.4	L	1.3	L	3.0	L	3.0	L	
COPPER	6.9		6.2		5.2	L	10.6		11.4		
IRON	8790		7570		2970		9570		6330		
LEAD	26.6	J	67.9	J	25.9	J	251	J	260	J	
MAGNESIUM	963	L	902	L	338	L	957	L	1030	L	
MANGANESE	134		127		163		174		164		
MERCURY	0.05	U	0.05	U	0.05	U	0.08	L	0.09	L	
NICKEL	6.8	L	6.4	L	2.1	U	8.6	L	8.9	LJ	
POTASSIUM	1070	L	778	L	377	L	795	L	762	L	
SELENIUM	0.22	UJv	0.24	UJv	0.21	U	0.23	UJv	0.23	U	
SILVER	0.71	U	0.69	U	0.64	U	0.71	U	0.72	U	
SODIUM	23.1	L	18.0	L	10.7	U	70.6	L	56.1	L	
THALLIUM	0.29	L	0.36	L	0.21	U	0.39	L	0.35	L	
VANADIUM	15.6		13.5		4.0	LJv	16.8		14.7		
ZINC	26.2		24.1		50.7		70.1		69.7		
CYANIDE	0.30	U	0.30	U	0.28	U	0.30	U	0.30	U	
% SOLIDS	83.5		82.7		88.4		83.1		83.6		

5615861

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 25159 SDG No. MFGZ44 SDG Nos. To Follow SAS No. Date Rec 12/26/96

EPA Lab ID: ARI

Lab Location: Seattle, WA

Region: 6 Audit No.: 25159/MFGZ44

Re-Submitted CSF? Yes ____ No X

Box No(s): 1

COMMENTS:

3. The laboratory failed to paginate the page between pages 154 and 155. The reviewer added the appropriate page number to this page.

4. Page 316 was not listed on Form DC-2-2. The reviewer made the appropriate correction.

14/15. The laboratory failed to sign and date Airbill #7802823346. however, the airbill does not provide a section for the laboratory receipt date and signature.

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?		X	
4. Are enclosed documents listed?		X	
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?		X	
15. Dated?		X	
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: Linda Hoffman Linda Hoffman / ESAT Data Reviewer Date 01/02/97

Audited by: ____ ____ Date ____

Audited by: ____ ____ Date ____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature Printed Name/Title

In Reference to
Case 25159/SDG MFGZ44
Page 1 of 2 pages
ESAT File No.: I2073

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

FAX Record Log

56158 63

Date of FAX: January 7, 1997

Laboratory Name: ARI

Lab Contact: Jeff Reitan

Region: 6

Regional Contact: Linda Hoffman (ESAT)

FAX Initiated by: Region

In reference to data for the following sample number(s):

All samples in this SDG.

Summary of Questions/Issues:

1. The sample tags were not encased in the contractually required clear plastic bags (ILM04.0, Exhibit F, F-13, 5th bullet). Please acknowledge this requirement and note for the future.

2. On the SDG/TR Cover Sheet (p. 365), the last sample in the SDG is also listed as the SDG number. Please correct this discrepancy and resubmit page 365.

3. The SDG number was not recorded on the traffic reports under the "Lab Receipt Date" (ILM04.0, Exhibit B, B-6, 2nd paragraph from bottom of page). Please acknowledge and note for the future.

4. On the Form 1's, the "Date Received" is incorrect for the samples on pages 7, 8, 9, 10, 12, 13, 19, 20, 21, 25, and 26. The received date for these samples is 11/19/96, not 11/20/96. Please make the necessary corrections and resubmit the listed pages.

5. On Form 1 (p. 21), the lead result is incorrectly reported. The correct result should be 55,000, not 55,049. Please correct the lead concentration and resubmit page 21.

561586

6. In the lead instrument raw data, time of analysis was not recorded for the initial and continuing calibration verifications and blanks (ILM04.0, Exhibit B, B-11, d, #9). Please add the time of each ICV, ICB, CCV, and CCB analysis to the lead instrument raw data and resubmit.

7. Please explain why the ICV/CCV concentrations in the cyanide raw data do not always agree with the concentrations reported on the Form 2's and make any necessary corrections and resubmissions.

8. The instrument ID was not recorded in the cyanide raw data (ILM04.0, Exhibit B, B-9, C.2.d and B-11, #7). Please record the instrument ID, as it appears on Form 14, on the first page of the cyanide raw data and resubmit.

The EPA expects the laboratory to look into items and submit data within seven days to Mahmoud El-Feky, U.S. EPA, 10625 Fallstone Road, Houston TX 77099.

Signature

01/07/97
Date

Distribution: (1) Lab Copy, (2) Region Copy

Lockheed Martin Services Group
ESAT Region 6

10101 S. W. Freeway, Suite 500, Houston, TX 77074 TEL:(713) 988-2983

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FACSIMILE COVER SHEET

Please deliver the following pages to:

Name Jeff Reitan

Firm ARI

City Seattle **State** WA

Telephone 206-621-6490 **Ext.** _____

FAX Telephone No. 206-621-7523 **Ext.** _____

Sender:

Name Linda Hoffman ESAT

Date 01/07/97 **Time** _____

Total Number of pages including this Cover Sheet 3

If you do not receive all the pages or if any pages are unclear, please call: (713) 988-2983.

MESSAGES: _____

FAX No. (713) 988-2994

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

5615866

MEMORANDUM

Date: 1-16-1997

Subject: **Contract Laboratory Program Data Review**

From: M. Humphreys for
Melvin L. Ritter, ESAT RPO, 6MD-HC

To: L. Biasco , 6SF-RA

Site: WILCOX OIL

Case#: 25159

SDG#: FF-G24

The EPA Region 6 Houston Branch ESAT data validation team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review and assessment report for this case.

The data package was found to be:

(X) Acceptable: No major problems with data package.

( ) Provisional: Use of data requires caution.
Data is acceptable for Regional use. Problems are noted in the review report.

( ) Unacceptable: Some or all of data should not be used.
Problems are noted in the review report.

Questions regarding the data review report can be addressed to me.

Attachments

cc: R. Flores, Region 6 CLP/TPO
M. El-feky, Region 6 Data Coordinator

Files (2)

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LOCKHEED MARTIN SERVICES GROUP
10101 Southwest Freeway, Suite 500
HOUSTON, TX 77074

5615867

MEMORANDUM

DATE: January 10, 1997

TO: Dr. Melvin Ritter, ESAT RPO, Region VI

FROM: Dr. Tom C. H. Chiang, ESAT ETM, Region VI

SUBJECT: CLP Data Review

REF: TDF # 6-7114A
ESAT # O-1787

Attached is the data review summary for Case # 25159
SDG # FFG24
Site Wilcox Oil

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF THE DATA PACKAGE

A. The data package contained the following contractual non-compliance as determined by the CCS audit and confirmed by hard copy data review.

The laboratory extracted BNA samples FF-G24 and FF-G24MS 12 days past the holding time limit, 22 days after sample receipt (OLM03.0, D-18/SVOA, 8.4.1). Sample results were not technically affected by this non-compliance.

B. The data package contained the following contractual non-compliance as determined by the hard copy data review but not by CCS.

The data package was three days late.

II. TECHNICAL/USABILITY ASSESSMENT OF THE DATA PACKAGE

A total of 125 results were reviewed for this data package. The data package is technically acceptable although it contained two contractual non-compliances.

000671

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

5615868

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 25159 | SITE Wilcox Oil
LABORATORY AATS | NO. OF SAMPLES 1
CONTRACT# 68-D5-0022 | MATRIX Soil
SDG# FFG24 | REVIEWER (IF NOT ESD) ESAT
SOW# RAS SOW OLM03.2 | REVIEWER'S NAME Maria Missler
ACCT# 7FAXJN28 SF# FAXUZZ | COMPLETION DATE January 10, 1997

SAMPLE NO. FF-G24

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	O	O	O
2. GC/MS TUNE/INSTR. PERFORM.	O	O	O
3. CALIBRATIONS	O	O	O
4. BLANKS	O	O	O
5. SMC/SURROGATES	O	O	O
6. MATRIX SPIKE/DUPLICATE	O	O	O
7. OTHER QC	N/A	N/A	N/A
8. INTERNAL STANDARDS	O	O	N/A
9. COMPOUND ID/QUANTITATION	O	O	O
10. PERFORMANCE/COMPLETENESS	O	O	O
11. OVERALL ASSESSMENT	O	O	O

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
NA = Not applicable.

ACTION ITEMS: BNA samples FF-G24 and FF-G24MS were extracted 12 days past the contractual holding time limit.

AREA OF CONCERN: The data package arrived three days late.

COMMENTS/CLARIFICATIONS
REGION 6 CLP QA REVIEW

CASE 25159 **SDG** FFG24 **SITE** Wilcox Oil **LAB** AATS

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

No.	Acceptable	Provisional	Unacceptable
VOA	1		
BNA	1		
PEST	1		

COMMENTS: The case consisted of one soil sample for complete RAS organic analysis. The OTR/COC Record designated sample FF-G24 for MS/MSD analyses. The data package arrived 3 days late for the contractual 35-day turnaround time. BNA samples FF-G24 and FF-G24MS were extracted 12 days past the contractual holding time limit.

The laboratory analyzed the VOA/BNA soil samples following the low level methods. No TCL analytes were reported in the sample above the CRQL's. Results are acceptable for sample FF-G24.

The technical usability of all reported sample results is appropriately indicated by ESAT's final data qualifiers in the attached Data Summary Tables. An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the Evidence Inventory Checklist is attached to this report.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL AND TECHNICAL ISSUES. THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS.

1. **Holding Times:** Acceptable. The sample met the contractual holding time requirements except as follows. No technical holding time criteria exist for soil samples.

BNA samples FF-G24 and FF-G24MS were extracted 22 days after collection and receipt. This holding time problem did not affect the spiked sample results as the spike compounds were added at the time of sample extraction. The reviewer did not qualify results for the native sample FF-G24 because the reported TCL analyte results were consistent with those in sample FF-G24MSD, which met the holding time criteria.

2. **Tuning/Performance:** Acceptable. The BFB and DFTPP analyses met GC/MS tuning criteria. The VOA and BNA sample analyses were within 12 hours of the respective BFB/DFTPP analyses. The Pest/PCB analyses met performance guidelines.

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CASE 25159 SDG FFG24 SITE Wilcox Oil LAB AATS

5615869

3. **Calibrations:** Acceptable. Target compounds generally met contractual and technical criteria for all fractions.

Pest/PCB The reviewer was unable to verify the following calibration results on both analytical columns based on the raw data submitted:

all analyte and surrogate initial calibration factors; and

all nominal amounts in calibration verification analyses PEM and INDAM/INDBM.

The results reported by the laboratory differed consistently by a factor of two from the reviewer-calculated ones. The reviewer did not qualify results because the reported %RSD and %D values were not affected. However, the laboratory was contacted for clarification of this discrepancy.

4. **Blanks:** Acceptable. The method, storage, and instrument blanks met contractual requirements.

The BNA method blanks contained phthalates below the CRQL's. In the reviewer's opinion, all "B"-flagged laboratory results should be used as quantitation limits because the sample concentrations were less than 10X the associated blank concentrations.

The VOA storage blank and its associated method blank contained acetone below the CRQL. Sample results were not affected.

5. **System Monitoring Compounds (SMC)/Surrogates:** Acceptable.

VOA/BNA The VOA MS/MSD analyses had low recoveries for one SMC. Since the unspiked sample had acceptable recoveries, results were not qualified. Other SMC and surrogate recoveries met QC criteria.

Pest/PCB All reported surrogate recoveries were a factor of two lower than the reviewer-calculated ones. This problem is a consequence of the incorrect calibration factors reported for the initial calibrations (see section 3). Since surrogate recoveries were within QC limits based on the reviewer's calculations, no results were qualified.

6. **Matrix Spike/Matrix Spike Duplicate:** Acceptable. The MS/MSD analyses met recovery and precision requirements with one exception. Trichloroethene had a high MS recovery. Since the analyte was not detected in the unspiked sample, sample results were not affected.

ORGANIC QA REVIEW
CONTINUATION PAGE

CASE 25159 **SDG** FFG24 **SITE** Wilcox Oil **LAB** AATS

7. **Other QC:** Not Applicable.

8. **Internal Standards:** Acceptable. The internal standard (IS) responses and retention times were within the QC limits for all analyses.

9. **Compound Identity/Quantitation:** Acceptable. No TCL analytes were detected in the sample above the CRQL's. PAH's and phthalates were reported below the CRQL's. Reported analytes met compound identification criteria.

10. **Performance/Completeness:** Acceptable. The data package was complete with minor deficiencies. The laboratory was contacted for correction and resubmission (see attached FAX Record Log).

11. **Overall Assessment:** Data are acceptable for sample FF-G24.

000675

ORGANIC DATA QUALIFIER DEFINITIONS

The fcllowing definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

56158?1

U Not detected at reported quantitation limit.

N Identification is tentative.

J Estimated value.

R Unusable.

^ High biased. Actual concentration may be lower than the concentration reported.

v Low biased. Actual concentration may be higher than the concentration reported.

F+ A false positive exists.

F- A false negative exists.

B This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.

UJ Estimated quantitation limit.

T Identification is questionable because of absence of other commonly coexisting pesticides.

***** Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG24 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES		FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G24							
Chloromethane	11 U							
Bromomethane	11 U							
Vinyl chloride	11 U							
Chloroethane	11 U							
Methylene chloride	11 U							
Acetone	11 U							
Carbon disulfide	11 U							
1,1-Dichloroethene	11 U							
1,1-Dichloroethane	11 U							
1,2-Dichloroethene (total)	11 U							
Chloroform	11 U							
1,2-Dichloroethane	11 U							
2-Butanone	11 U							
1,1,1-Trichloroethane	11 U							
Carbon tetrachloride	11 U							
Bromodichloromethane	11 U							
1,2-Dichloropropane	11 U							
cis-1,3-Dichloropropene	11 U							
Trichloroethene	11 U							
Dibromochloromethane	11 U							
1,1,2-Trichloroethane	11 U							
Benzene	11 U							
trans-1,3-Dichloropropene	11 U							
Bromoform	11 U							
4-Methyl-2-pentanone	11 U							
2-Hexanone	11 U							
Tetrachloroethene	11 U							
1,1,2,2-Tetrachloroethane	11 U							
Toluene	11 U							
Chlorobenzene	11 U							
Ethylbenzene	11 U							
Styrene	11 U							
Xylenes (total)	11 U							
Sample wt (g):	5							
%Moisture:	10							
Dilution Factor:	1							
Level:	LOW							
Number of TIC's:	0							

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG24 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	SED-10 FF-G24						
Phenol	370 U						
bis(2-Chloroethyl)ether	370 U						
2-Chlorophenol	370 U						
1,3-Dichlorobenzene	370 U						
1,4-Dichlorobenzene	370 U						
1,2-Dichlorobenzene	370 U						
2-Methylphenol	370 U						
2,2'-Oxybis(1-chloropropane)	370 U						
4-Methylphenol	370 U						
N-Nitroso-di-n-propylamine	370 U						
Hexachloroethane	370 U						
Nitrobenzene	370 U						
Isophorone	370 U						
2-Nitrophenol	370 U						
2,4-Dimethylphenol	370 U						
bis(2-Chloroethoxy)methane	370 U						
2,4-Dichlorophenol	370 U						
1,2,4-Trichlorobenzene	370 U						
Naphthalene	370 U						
4-Chloroaniline	370 U						
Hexachlorobutadiene	370 U						
4-Chloro-3-methylphenol	370 U						
2-Methylnaphthalene	370 U						
Hexachlorocyclopentadiene	370 U						
2,4,6-Trichlorophenol	370 U						
2,4,5-Trichlorophenol	920 U						
2-Chloronaphthalene	370 U						
2-Nitroaniline	920 U						
Dimethylphthalate	370 U						
Acenapnthylene	370 U						
2,6-Dinitrotoluene	370 U						
3-Nitroaniline	920 U						
Acenaphthene	370 U						
2,4-Dinitrophenol	920 U						
4-Nitrophenol	920 U						
Dibenzofuran	370 U						
2,4-Dinitrotoluene	370 U						
Diethylphthalate	370 U						
4-Chlorophenyl-phenylether	370 U						
Fluorene	370 U						
4-Nitroaniline	920 U						
4,6-Dinitro-2-methylphenol	920 U						
N-Nitrosodiphenylamine	370 U						
4-Bromophenyl-phenylether	370 U						
Hexachlorobenzene	370 U						
Pentachlorophenol	920 U						
Phenanthrene	22 J						
Anthracene	370 U						

56158733

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG24 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G24							
Carbazole	370 U							
Di-n-butylphthalate	370 U							
Fluoranthene	22 J							
Pyrene	58 J							
Butylbenzylphthalate	370 U							
3,3'-Dichlorobenzidine	370 U							
Benzo(a)anthracene	27 J							
Chrysene	54 J							
bis(2-Ethylhexyl)phthalate	370 U							
Di-n-octylphthalate	370 U							
Benzo(b)fluoranthene	30 J							
Benzo(k)fluoranthene	370 U							
Benzo(a)pyrene	20 J							
Indeno(1,2,3-cd)pyrene	370 U							
Dibenz(a,h)anthracene	370 U							
Benzo(g,h,i)perylene	370 U							
Sample wt (g):	30							
%Moisture:	10							
Dilution Factor:	1							
Level:	LOW							
Number of TIC's:	13							

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG24 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G24						
alpha-BHC	1.9 U						
beta-BHC	1.9 U						
delta-BHC	1.9 U						
gamma-BHC (lindane)	1.9 U						
Heptachlor	1.9 U						
Aldrin	1.9 U						
Heptachlor epoxide	1.9 U						
Endosulfan I	1.9 U						
Dieldrin	3.7 U						
4,4'-DDE	3.7 U						
Endrin	3.7 U						
Endosulfan II	3.7 U						
4,4'-DDD	3.7 U						
Endosulfan sulfate	3.7 U						
4,4'-DDT	3.7 U						
Methoxychlor	19 U						
Endrin ketone	3.7 U						
Endrin aldehyde	3.7 U						
alpha-Chlordane	1.9 U						
gamma-Chlordane	1.9 U						
Toxaphene	190 U						
Aroclor-1016	37 U						
Aroclor-1221	74 U						
Aroclor-1232	37 U						
Aroclor-1242	37 U						
Aroclor-1248	37 U						
Aroclor-1254	37 U						
Aroclor-1260	37 U						
Sample wt (g):	30						
%Moisture:	10						
Dilution Factor:	1						

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

5615875

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 25159 SDG No. FFG24 SDG Nos. To Follow SAS No. Date Rec 12/27/96

EPA Lab ID: AATS

Lab Location: Broken Arrow, OK 74012

Region: 6 Audit No.: 25159/FFG24

Re-Submitted CSF? Yes _____ No X

Box No(s): 1

COMMENTS:

13 No airbills were available as the samples were delivered in person.

56159 79

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?			X
14. Signed?			X
15. Dated?			X
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a.If "NO", does the copy indicate where original documents are located?	X		

Audited by: Maria Missler Maria Missler / ESAT Data Reviewer Date 1/8/97

Audited by: _____ _____ Date _____

Audited by: _____ _____ Date _____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____

Entered by: _____ _____

Reviewed by: _____ _____

Signature Printed Name/Title

In Reference to Case No(s):
25159 SDG: FFG24 (O-1787)

5615877

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Date of FAX: January 10, 1997
Laboratory Name: AATS
Lab Contact: Harry Borg

Region: 6
Regional Contact: Maria Missler - ESAT

FAX initiated by: _____Laboratory ___X___Region

In reference to data for the following fractions:

VOA Pest/PCB

Summary of Questions/Issues:

A. VOA

1. Method Blank VBLK3: A spectrum was submitted for the TIC at 12.190 minutes (page 145) but the TIC was not listed on Form I VOA-TIC (page 138). Please revise the Form I VCA-TIC to include this TIC and resubmit.

B. Pest/PCB

1. Forms VI PEST-2, pages 397 and 398: The reviewer was unable to reproduce the calibration factors reported for all TCL analytes and surrogates based on the raw data (pages 431-444). Please correct and resubmit these forms to match the raw data or demonstrate your calculations.

2. Forms VII PEST-1 and Forms VII PEST-2, pages 406-411: The reviewer was unable to reproduce the nominal amount on these forms based on a 0.5 µL injection. According to your case narrative (pages 4-7) the nominal amount on these forms should be half of what is reported. Please correct these forms to match your raw data and to match the corrected calibration factors in question 1 above.

FAX COMMUNICATION LOG

Continuation Page 2
Laboratory/Contact AATS / Harry Borg
In Reference To Case No. 25159 **SDG:** FFG24

5615378

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (OLM03.0, p. B-29), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately **within 7 days** to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (713) 988-2995.

Maria Nisslier
Signature

January 10, 1997
Date

Distribution: (1) **Lab Copy** (2) **Region Copy**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

5615879

MEMORANDUM

Date: 1-21-1997

Subject: **Contract Laboratory Program Data Review**

From: Melvin L. Ritter, ESAT RPO, 6MD-HC

To: L. Biasco , 6SF-RA

Site: WILCOX OIL

Case#: 25159

SDG#: FF-G02

The EPA Region 6 Houston Branch ESAT data validation team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review and assessment report for this case.

The data package was found to be:

( ) Acceptable: No major problems with data package.

(X) Provisional: Use of data requires caution.
Data is acceptable for Regional use. Problems are noted in the review report.

( ) Unacceptable: Some or all of data should not be used.
Problems are noted in the review report.

Questions regarding the data review report can be addressed to me.

Attachments

cc: R. Flores, Region 6 CLP/TPO
M. El-feky, Region 6 Data Coordinator

Files (2)

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LOCKHEED MARTIN SERVICES GROUP
10101 Southwest Freeway, Suite 500
HOUSTON, TX 77074

5615880

MEMORANDUM

DATE: January 10, 1997
TO: Dr. Melvin Ritter, ESAT RPO, Region VI
FROM: Dr. Tom C. H. Chiang, ESAT ETM, Region VI
SUBJECT: CLP Data Review
REF: TDF # 6-7113A
ESAT # O-1780

Attached is the data review summary for Case # 25159
SDG # FFG02
Site Wilcox Oil

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF THE DATA PACKAGE

A. The data package contained the following contractual non-compliance as determined by the hard copy data review and the CCS audit.

The laboratory extracted BNA sample FF-G06RE 29 days after sample receipt (OLM03.0, D-18/SVOA, 8.4.1). All results were qualified for this sample because of the excessive holding time.

B. The data package contained the following contractual non-compliance as determined by the hard copy data review but not by CCS.

1. Pest/PCB method blank PBLKSC had a peak on the DB-17 column above the CRQL that interfered with the detection of endosulfan sulfate (OLM03.0, D-73/PEST, 12.1.2.4). This deficiency caused the raised quantitation limits for endosulfan sulfate in samples FF-G15 and FF-G23.

2. The data package arrived three days late.

II. TECHNICAL/USABILITY ASSESSMENT OF THE DATA PACKAGE

A total of 2,500 results were reviewed for this data package. The data package is technically provisional and technical deficiencies are listed below.

1. One BNA sample was extracted 29 days after sample collection.

2. Four VOA and eight BNA samples had low internal standard responses.

000685

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

5615881

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO.	25159	SITE	Wilcox Oil
LABORATORY	AATS	NO. OF SAMPLES	20
CONTRACT#	68-D5-0022	MATRIX	Soil
SDG#	FFG02	REVIEWER (IF NOT ESD)	ESAT
SOW#	RAS SOW OLM03.2	REVIEWER'S NAME	Maria Missler
ACCT#	7FAXJN28 SF# FAXUZZ	COMPLETION DATE	January 10, 1997

SAMPLE NO.				
FF-G02	FF-G06	FF-G10	FF-G14	FF-G18
FF-G03	FF-G07	FF-G11	FF-G15	FF-G21
FF-G04	FF-G08	FF-G12	FF-G16	FF-G22
FF-G05	FF-G09	FF-G13	FF-G17	FF-G23

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	O	M	O
2. GC/MS TUNE/INSTR. PERFORM.	O	O	O
3. CALIBRATIONS	M	O	O
4. BLANKS	O	O	M
5. SMC/SURROGATES	O	O	O
6. MATRIX SPIKE/DUPLICATE	O	O	O
7. OTHER QC	M	O	O
8. INTERNAL STANDARDS	M	M	N/A
9. COMPOUND ID/QUANTITATION	O	O	M
10. PERFORMANCE/COMPLETENESS	O	O	O
11. OVERALL ASSESSMENT	M	M	M

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
NA = Not applicable.

ACTION ITEMS: BNA sample FF-G06RE was extracted 19 days past the holding time requirement. One Pest/PCB method blank had a peak that interfered with the detection of endosulfan sulfate above the CRQL on one column.

AREA OF CONCERN: The extraction holding time was excessive for BNA sample FF-G06RE. A contaminant in the method blank obscured the detection of endosulfan sulfate in two Pest/PCB samples. Acetone failed technical calibration criteria. Four VOA and eight BNA samples had low internal standard responses. Results were inconsistent for a pair of field duplicates. The two column quantitation results differed by more than 25 percent for three Pest/PCB samples. The data package arrived three days late.

000686

COMMENTS/CLARIFICATIONS
REGION 6 CLP QA REVIEW

CASE 25159 **SDG** FFG02 **SITE** Wilcox Oil **LAB** AATS

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

No.	Acceptable	Provisional	Unacceptable
VOA	14	6	
BNA	11	9	
PEST	16	4	

COMMENTS: The case consisted of 20 soil samples for complete RAS organic analysis. The OTR/COC Record designated sample FF-G02 for MS/MSD analyses and samples FF-G07/FF-G08, FF-G17/FF-G18, and FF-G22/FF-G23 as field duplicate pairs. The laboratory analyzed at low levels the VOA/BNA soil samples.

The data package contained the following contractual non-compliances.

BNA sample FF-G06RE was extracted 19 days past the contractual holding time limit. Only sample FF-G06RE is billable even though the laboratory also submitted data for the original analysis FF-G06.

The Pest/PCB method blank PBLKSC had a peak interfering with the detection of endosulfan sulfate above the CRQL on one column.

The data package arrived 3 days late for the contractual 35-day turnaround time.

VOA Samples FF-G11, FF-G13, FF-G15, and FF-G22 and their reanalyses had low internal standard responses. The reanalyses should be used for all except sample FF-G15.

BNA The extraction holding time for sample FF-G06RE was excessive (29 days past collection). Samples FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 and their reanalyses had low internal standard responses. To minimize data qualification, the reviewer recommends using some results from the original analysis and some from the reanalysis depending on the associated internal standard performance.

Pest/PCB An interfering contaminant in the method blank obscured the detection of endosulfan sulfate in samples FF-G15 and FF-G23.

000687

CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

5615883

Comments (continued)

Acetone, methylene chloride, phenanthrene, pyrene, chrysene, benzo(ghi)perylene, chlordanes, endrin, heptachlor epoxide, endosulfan sulfate, endrin ketone, endrin aldehyde, and endosulfan II were reported in a few samples above the CRQL's. Some results are provisional for six VOA, nine BNA, and four Pest/PCB samples because of problems with holding time, calibration, blank contamination, field duplicate consistency, internal standard responses, and compound quantitation.

The technical usability of all reported sample results is appropriately indicated by ESAT's final data qualifiers in the attached Data Summary Tables. An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the Evidence Inventory Checklist is attached to this report.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL AND TECHNICAL ISSUES. THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS.

1. **Holding Times:** Provisional. All samples met the contractual holding time requirement except as follows. No technical holding time criteria exist for soil samples.

BNA sample FF-G06RE was extracted 29 days after collection and receipt. In the reviewer's opinion, all results are estimated and biased low because of the excessive holding time.

2. **Tuning/Performance:** Acceptable. The BFB and DFTPP analyses met GC/MS tuning criteria. The VOA and BNA sample analyses were within 12 hours of the respective BFB/DFTPP analyses. The Pest/PCB analyses met performance guidelines.

3. **Calibrations:** Provisional. Target compounds met contractual calibration criteria. The acetone result is estimated in VOA sample FF-G17 because of a technical %D calibration deficiency.

Pest/PCB The reviewer was unable to reproduce the following calibration results on both analytical columns based on the raw data submitted:

the TCX and DCB initial calibration factors; and

the TCX and DCB calculated amounts in all INDAM/INDBM calibration verification analyses.

000688

CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

3. **Calibrations, Pest/PCB** (continued)

The results reported by the laboratory differed consistently by a factor of two from the reviewer-calculated ones. The reviewer did not qualify results because the reported %RSD and %D values were not affected. However, the laboratory was contacted for clarification of this discrepancy.

4. **Blanks:** Provisional. The VOA and BNA method and storage blanks met contractual requirements.

BNA The method blanks contained phthalates below the CRQL's. In the reviewer's opinion, all "B"-flagged laboratory results should be considered as undetected (U) because the sample concentrations were less than 10X the associated blank concentrations.

Pest/PCB Soil method blank PBLKSC contained a peak above the CRQL that interfered with the identification of endosulfan sulfate on one column. The reviewer qualified as undetected the endosulfan sulfate results in associated samples FF-G15 and FF-G23 because of possible laboratory contamination.

In the reviewer's opinion, the following results should be used as raised quantitation limits because of the presence of the analyte in the associated method blanks (below the CRQL's) on one or both columns:

endrin aldehyde in sample FF-G12; and

γ-chlordane in sample FF-G17.

The γ-chlordane result in sample FF-G18 is biased high and "B" flagged because of possible laboratory contamination.

5. **System Monitoring Compounds (SMC)/Surrogates:** Acceptable. The SMC and surrogate recoveries met QC criteria except as follows.

BNA Sample FF-G06 had high recoveries for two base-neutral surrogates. The re-extraction had acceptable recoveries and should be used.

Samples FF-G17RE, FF-G18RE, FF-G21RE, and FF-G22RE had high recoveries for two base-neutral surrogates. No results were qualified for the high recoveries as no analytes were detected above the CRQL's in these samples.

000689

CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

5615885

5. **System Monitoring Compounds (SMC)/Surrogates** (continued)

Pest/PCB All reported surrogate recoveries were a factor of two lower than the reviewer-calculated ones. This problem is a consequence of the incorrect calibration factors reported for the initial calibrations (see section 3). All surrogate recoveries were within QC limits based on the reviewer's calculations.

6. **Matrix Spike/Matrix Spike Duplicate:** Acceptable. The MS/MSD analyses met recovery and precision requirements for all fractions.

7. **Other QC:**

Field Duplicates: Provisional. The acetone and methylene chloride results are estimated in field duplicates FF-G17 and FF-G18 because of inconsistent concentrations (differ by a factor of two or more). Other field duplicate results were consistent.

8. **Internal Standards:** Provisional. The internal standard (IS) responses and retention times were within the QC limits with the following exceptions.

VOA Samples FF-G11, FF-G13, FF-G15, and FF-G22 were reanalyzed because of low IS responses. The reanalyses had low but improved responses for samples FF-G11, FF-G13, and FF-G22, so the reanalysis data should be used. The original analysis data should be used for sample FF-G15.

Results are estimated and quantitation limits biased low for analytes associated with the following IS's because of the low IS responses:

Sample	IS
FF-G11RE	IS3
FF-G13RE	IS1, IS3
FF-G15	IS2, IS3
FF-G22RE	IS3

BNA Sample FF-G06 had low internal standard responses, but the reanalysis had acceptable responses, and data should be used. Sample FF-G02MSD had one low IS response, but reanalysis was not required.

000690

CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

8. **Internal Standards, BNA** (continued)

Samples FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 and their reanalyses had outlying IS responses. To minimize data qualification, the reviewer recommends using some results from the original analysis and some from the reanalysis depending on the associated IS performance. The results designated for use are indicated on the attached data summary tables.

The reviewer qualified results as estimated and quantitation limits biased low for analytes associated with the following IS's because of the low IS responses:

Sample	IS
FF-G09	IS6
FF-G15	IS4, IS5, IS6
FF-G16	IS4, IS5, IS6
FF-G17	IS5, IS6
FF-G18	IS5, IS6
FF-G21	IS5, IS6
FF-G22	IS4, IS5, IS6
FF-G23	IS5, IS6

9. **Compound Identity/Quantitation:** Provisional. Acetone, methylene chloride, phenanthrene, pyrene, chrysene, benzo(ghi)-perylene, chlordanes, endrin, heptachlor epoxide, endosulfan sulfate, endrin ketone, endrin aldehyde, and endosulfan II were reported in a few samples above the CRQL's. Compound identification and quantitation met contractual guidelines for the VOA and BNA samples. GC/MS confirmation was not feasible for the Pest/PCB positive results.

Pest/PCB The "P" flagged results above CRQL's are estimated in samples FF-G15, FF-G17, FF-G18, and FF-G23 because the quantitation results between the two columns differ by more than 25 percent.

10. **Performance/Completeness:** Acceptable. The laboratory response to the CCS request was received and should be used. The data package was complete with minor deficiencies. The laboratory was contacted for correction and resubmission (see attached FAX Record Log).

000691

ORGANIC QA REVIEW
CONTINUATION PAGE

CASE 25159 **SDG** FFG02 **SITE** Wilcox Oil **LAB** AATS

5615887

11. Overall Assessment: Data are acceptable for 14 VOA, 11 BNA, and 16 Pest/PCB samples.

VOA Some results are estimated for samples FF-G11RE, FF-G13RE, FF-G15, FF-G17, FF-G18, and FF-G22RE because of a calibration deficiency, inconsistent field duplicate results, and low internal standard responses.

2212286

BNA Some results are estimated for samples FF-G06RE, FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 because of a holding time problem and low internal standard responses.

Pest/PCB Some results are estimated for samples FF-G15, FF-G17, FF-G18, and FF-G23 because of blank contamination and compound quantitation deficiencies.

000692

ORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

U	Not detected at reported quantitation limit.
N	Identification is tentative.
J	Estimated value.
R	Unusable.
^	High biased. Actual concentration may be lower than the concentration reported.
v	Low biased. Actual concentration may be higher than the concentration reported.
F+	A false positive exists.
F-	A false negative exists.
B	This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.
UJ	Estimated quantitation limit.
T	Identification is questionable because of absence of other commonly coexisting pesticides.
*	Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	SED-01 FF-G02	SED-02 FF-G03	SED-03 FF-G04	SED-04 FF-G05	SED-05 FF-G06	SED-06 FF-G07	SED-07 FF-G08
Chloromethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Bromomethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Vinyl chloride	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Chloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Methylene chloride	1 J	1 J	2 J	2 J	13 U	13 U	2 J
Acetone	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Carbon disulfide	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,1-Dichloroethene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,1-Dichloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,2-Dichloroethene (total)	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Chloroform	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,2-Dichloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
2-Butanone	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,1,1-Trichloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Carbon tetrachloride	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Bromodichloromethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,2-Dichloropropane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
cis-1,3-Dichloropropene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Trichloroethene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Dibromochloromethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,1,2-Trichloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Benzene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
trans-1,3-Dichloropropene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Bromoform	12 U	12 U	13 U	12 U	13 U	13 U	13 U
4-Methyl-2-pentanone	12 U	12 U	13 U	12 U	13 U	13 U	13 U
2-Hexanone	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Tetrachloroethene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
1,1,2,2-Tetrachloroethane	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Toluene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Chlorobenzene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Ethylbenzene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Styrene	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Xylenes (total)	12 U	12 U	13 U	12 U	13 U	13 U	13 U
Sample wt (g):	5	5	5	5	5	5	5
%Moisture:	18	16	21	19	22	25	23
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	1	1	1	1	1	0	0

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

615889

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	SED-08 FF-G09	SED-09 FF-G10	SS-01 FF-G11	SS01 FF-G11RE	SS-02 FF-G12	SS-03 FF-G13	FF-G13RE
Chloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Bromomethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Vinyl chloride	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Chloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Methylene chloride	5 J	12 U	5 *	12 U	12 U	12 U *	28 J
Acetone	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Carbon disulfide	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1-Dichloroethene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1-Dichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,2-Dichloroethene (total)	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Chloroform	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,2-Dichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
2-Butanone	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1,1-Trichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Carbon tetrachloride	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Bromodichloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
1,2-Dichloropropane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
cis-1,3-Dichloropropene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Trichloroethene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Dibromochloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
1,1,2-Trichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Benzene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
trans-1,3-Dichloropropene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Bromoform	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
4-Methyl-2-pentanone	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
2-Hexanone	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Tetrachloroethene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
1,1,2,2-Tetrachloroethane	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Toluene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Chlorobenzene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Ethylbenzene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Styrene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Xylenes (total)	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Sample wt (g):	5	5	5	5	5	5	5
%Moisture:	29	18	19	19	20	14	14
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	0	0	0	0	0	0	1

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

WHITES

VOLATILES	FLAG	SS-04 FF-G14	FLAG	SS-05 FF-G15	FLAG	FF-G15RE	FLAG	SS-06 FF-G16	FLAG	SS-07 FF-G17	FLAG	SS-08 FF-G18	FLAG	SS-11 FF-G21	FLAG
Chloromethane		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
Bromomethane		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
Vinyl chloride		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
Chloroethane		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
Methylene chloride		12 U		2 J		11 U	*	13 U		23 J		12 UJ		12 U	
Acetone		12 U		11 U		11 U	*	13 U		48 J		12 UJ		12 U	
Carbon disulfide		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
1,1-Dichloroethene		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
1,1-Dichloroethane		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
1,2-Dichloroethene (total)		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
Chloroform		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
1,2-Dichloroethane		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
2-Butanone		12 U		11 U		11 U	*	13 U		12 U		12 U		12 U	
1,1,1-Trichloroethane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Carbon tetrachloride		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Bromodichloromethane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
1,2-Dichloropropane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
cis-1,3-Dichloropropene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Trichloroethene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Dibromochloromethane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
1,1,2-Trichloroethane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Benzene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
trans-1,3-Dichloropropene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Bromoform		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
4-Methyl-2-pentanone		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
2-Hexanone		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Tetrachloroethene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
1,1,2,2-Tetrachloroethane		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Toluene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Chlorobenzene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Ethylbenzene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Styrene		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Xylenes (total)		12 U		11 UJv		11 U	*	13 U		12 U		12 U		12 U	
Sample wt (g):		5		5		5		5		5		5		5	
%Moisture:		18		13		13		24		18		18		18	
Dilution Factor:		1		1		1		1		1		1		1	
Level:		LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:		0		0		0		0		0		0		0	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

5615891

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	5512 FF-G22	FF-G22RE	5513 FF-G23				
Chloromethane	12 U *	12 U	12 U				
Bromomethane	12 U *	12 U	12 U				
Vinyl chloride	12 U *	12 U	12 U				
Chloroethane	12 U *	12 U	12 U				
Methylene chloride	5 *	12 U	12 U				
Acetone	12 U *	12 U	12 U				
Carbon disulfide	12 U *	12 U	12 U				
1,1-Dichloroethene	12 U *	12 U	12 U				
1,1-Dichloroethane	12 U *	12 U	12 U				
1,2-Dichloroethene (total)	12 U *	12 U	12 U				
Chloroform	12 U *	12 U	12 U				
1,2-Dichloroethane	12 U *	12 U	12 U				
2-Butanone	12 U *	12 U	12 U				
1,1,1-Trichloroethane	12 U *	12 U	12 U				
Carbon tetrachloride	12 U *	12 U	12 U				
Bromodichloromethane	12 U *	12 U	12 U				
1,2-Dichloropropane	12 U *	12 U	12 U				
cis-1,3-Dichloropropene	12 U *	12 U	12 U				
Trichloroethene	12 U *	12 U	12 U				
Dibromochloromethane	12 U *	12 U	12 U				
1,1,2-Trichloroethane	12 U *	12 U	12 U				
Benzene	12 U *	12 U	12 U				
trans-1,3-Dichloropropene	12 U *	12 U	12 U				
Bromoform	12 U *	12 U	12 U				
4-Methyl-2-pentanone	12 U *	12 UJv	12 U				
2-Hexanone	12 U *	12 UJv	12 U				
Tetrachloroethene	12 U *	12 UJv	12 U				
1,1,2,2-Tetrachloroethane	12 U *	12 UJv	12 U				
Toluene	12 U *	12 UJv	12 U				
Chlorobenzene	12 U *	12 UJv	12 U				
Ethylbenzene	12 U *	12 UJv	12 U				
Styrene	12 U *	12 UJv	12 U				
Xylenes (total)	12 U *	12 UJv	12 U				
Sample wt (g):	5	5	5				
%Moisture:	18	18	18				
Dilution Factor:	1	1	1				
Level:	LOW	LOW	LOW				
Number of TIC's:	0	0	0				

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	SED-01 FF-G02		SED-02 FF-G03		SED-03 FF-G04		SED-04 FF-G05		SED-05 FF-G06		FF-G06RE		SED-06 FF-G07	
Phenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
bis(2-Chloroethyl)ether	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2-Chlorophenol	400 U		390 U		42 J		410 U		420 U	*	420 UJv		440 U	
1,3-Dichlorobenzene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
1,4-Dichlorobenzene	400 U		390 U		29 J		410 U		420 U	*	420 UJv		440 U	
1,2-Dichlorobenzene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2-Methylphenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,2'-Oxybis(1-chloropropane)	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Methylphenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
N-Nitroso-di-n-propylamine	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Hexachloroethane	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Nitrobenzene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Isophorone	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2-Nitrophenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,4-Dimethylphenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
bis(2-Chloroethoxy)methane	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,4-Dichlorophenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
1,2,4-Trichlorobenzene	400 U		390 U		27 J		410 U		420 U	*	420 UJv		440 U	
Napnthalene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Chloroaniline	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Hexachlorobutadiene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Chloro-3-methylphenol	400 U		390 U		34 J		410 U		420 U	*	420 UJv		440 U	
2-Methylnaphthalene	400 U		390 U		420 U		60 J		420 U	*	420 UJv		440 U	
Hexachlorocyclopentadiene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,4,6-Trichlorophenol	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,4,5-Trichlorophenol	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
2-Chloronaphthalene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2-Nitroaniline	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
Dimethylphthalate	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Acenaphthylene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,6-Dinitrotoluene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
3-Nitroaniline	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
Acenaphthene	400 U		390 U		32 J		22 J		420 U	*	420 UJv		440 U	
2,4-Dinitrophenol	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
4-Nitrophenol	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
Dibenzofuran	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
2,4-Dinitrotoluene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Diethylphthalate	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Chlorophenyl-phenylether	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Fluorene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Nitroaniline	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
4,6-Dinitro-2-methylphenol	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
N-Nitrosodiphenylamine	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
4-Bromophenyl-phenylether	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Hexachlorobenzene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	
Pentachlorophenol	1000 U		990 U		1000 U		1000 U		1100 U	*	1100 UJv		1100 U	
Phenanthrene	400 U		390 U		420 U		220 J		46	*	420 UJv		440 U	
Anthracene	400 U		390 U		420 U		410 U		420 U	*	420 UJv		440 U	

5615893

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G02	FF-G03	FF-G04	FF-G05	FF-G06	FF-G06RE	FF-G07
Carbazole	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Di-n-butylphthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Fluoranthene	400 U	390 U	420 U	130 J	420 U *	420 UJv	440 U
Pyrene	400 U	390 U	420 U	180 J	420 U *	420 UJv	440 U
Butylbenzylphthalate	35 J	36 J	34 J	57 J	420 U *	420 UJv	45 J
3,3'-Dichlorobenzidine	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(a)anthracene	400 U	390 U	420 U	100 J	420 U *	420 UJv	440 U
Chrysene	400 U	390 U	420 U	150 J	420 U *	420 UJv	440 U
bis(2-Ethylhexyl)phthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Di-n-octylphthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(b)fluoranthene	400 U	390 U	420 U	90 J	420 U *	420 UJv	440 U
Benzo(k)fluoranthene	400 U	390 U	420 U	84 J	420 U *	420 UJv	440 U
Benzo(a)pyrene	400 U	390 U	420 U	100 J	420 U *	420 UJv	440 U
Indeno(1,2,3-cd)pyrene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Dibenz(a,h)anthracene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(g,h,i)perylene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	16	21	19	22	22	25
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	10	9	9	22	20	35	33

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G08		FF-G09		FF-G09RE		FF-G10		FF-G11		FF-G12		FF-G13	
Phenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
bis(2-Chloroethyl)ether	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2-Chlorophenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
1,3-Dichlorobenzene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
1,4-Dichlorobenzene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
1,2-Dichlorobenzene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2-Methylphenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2,2'-Oxybis(1-chloropropane)	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
4-Methylphenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
N-Nitroso-di-n-propylamine	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Hexachloroethane	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Nitrobenzene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Isophorone	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2-Nitrophenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2,4-Dimethylphenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
bis(2-Chloroethoxy)methane	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2,4-Dichlorophenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
1,2,4-Trichlorobenzene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Naphthalene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
4-Chloroaniline	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Hexachlorobutadiene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
4-Chloro-3-methylphenol	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
2-Methylnaphthalene	430 U		460 U	*	460 U		400 U		410 U		410 U		380 U	
Hexachlorocyclopentadiene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2,4,6-Trichlorophenol	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2,4,5-Trichlorophenol	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
2-Chloronaphthalene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2-Nitroaniline	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
Dimethylphthalate	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
Acenaphthylene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2,6-Dinitrotoluene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
3-Nitroaniline	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
Acenaphthene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2,4-Dinitrophenol	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
4-Nitrophenol	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
Dibenzofuran	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
2,4-Dinitrotoluene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
Diethylphthalate	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
4-Chlorophenyl-phenylether	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
Fluorene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
4-Nitroaniline	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
4,6-Dinitro-2-methylphenol	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
N-Nitrosodiphenylamine	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
4-Bromophenyl-phenylether	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
Hexachlorobenzene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	
Pentachlorophenol	1100 U		1200 U		1200 U	*	1000 U		1000 U		1000 U		960 U	
Phenanthrene	210 J		460 U		460 U	*	400 U		410 U		34 J		380 U	
Anthracene	430 U		460 U		460 U	*	400 U		410 U		410 U		380 U	

5615895

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G08	FF-G09	FF-G09RE	FF-G10	FF-G11 (SS-01)	FF-G12 (SS-02)	FF-G13 (SS-03)
Carbazole	46 J	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-butylphthalate	430 U	460 U	460 U *	400 U	410 U	23 J	380 U
Fluoranthene	240 J	460 U	460 U *	400 U	410 U	68 J	380 U
Pyrene	170 J	49 J	43 *	400 U	410 U	62 J	380 U
Butylbenzylphthalate	48 J	29 J	32 *	400 U	25 J	21 J	380 U
3,3'-Dichlorobenzidine	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Benzo(a)anthracene	430 U	460 U	460 U *	400 U	410 U	36 J	380 U
Chrysene	96 J	49 J	44 *	400 U	410 U	50 J	380 U
bis(2-Ethylhexyl)phthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-octylphthalate	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(b)fluoranthene	430 U	31 J	29 *	400 U	410 U	42 J	380 U
Benzo(k)fluoranthene	430 U	31 J	29 *	400 U	410 U	51 J	380 U
Benzo(a)pyrene	430 U	27 J	24 *	400 U	410 U	36 J	380 U
Indeno(1,2,3-cd)pyrene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Dibenz(a,h)anthracene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(g,h,i)perylene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	23	29	29	18	19	20	14
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	35	33	28	21	35	26	35

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G14		FF-G15		FF-G15RE		FF-G16		FF-G16RE		FF-G17		FF-G17RE	
Phenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
bis(2-Chloroethyl)ether	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Chlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,3-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,4-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,2-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Methylphenol	400	U	380	U	380	U *	61	J	57	*	400	U *	400	U
2,2'-Oxybis(1-chloropropane)	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
4-Methylphenol	400	U	380	U	380	U *	94	J	100	*	400	U *	400	U
N-Nitroso-di-n-propylamine	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Hexachloroethane	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Nitrobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Isophorone	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Nitrophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2,4-Dimethylphenol	400	U	380	U	380	U *	360	J	380	*	400	U *	400	U
bis(2-Chloroethoxy)methane	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2,4-Dichlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,2,4-Trichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Naphthalene	400	U	81	J	380	U *	430	U	430	U *	400	U *	400	U
4-Chloroaniline	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Hexachlorobutadiene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
4-Chloro-3-methylphenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Methylnaphthalene	400	U	200	J	180	*	430	U	430	*	400	U *	400	U
Hexachlorocyclopentadiene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4,6-Trichlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4,5-Trichlorophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
2-Chloronaphthalene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Dimethylphthalate	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Acenaphthylene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,6-Dinitrotoluene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
3-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Acenaphthene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4-Dinitrophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
4-Nitrophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Dibenzofuran	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4-Dinitrotoluene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Diethylphthalate	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
4-Chlorophenyl-phenylether	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Fluorene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
4-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
4,6-Dinitro-2-methylphenol	1000	U	950	UJv	950	U *	1100	UJv	1100	U *	1000	U	1000	U *
N-Nitrosodiphenylamine	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
4-Bromophenyl-phenylether	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
Hexachlorobenzene	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
Pentachlorophenol	1000	U	950	UJv	950	U *	1100	UJv	1100	U *	1000	U	1000	U *
Phenanthrene	400	U	790	J	820	*	430	UJv	430	U *	400	U	400	U *
Anthracene	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *

5615897

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G14		FF-G15		FF-G15RE		FF-G16		FF-G16RE		FF-G17		FF-G17RE	
Carbazole	400 U		380 UJv		380 U	*	430 UJv		430 U	*	400 U		400 U	*
Di-n-butylphthalate	400 U		380 UJv		57	*	430 UJv		100	*	400 U		400 U	*
Fluoranthene	400 U		380 UJv		110	*	430 UJv		430 U	*	400 U		400 U	*
Pyrene	400 U		560 J		590	*	430 UJv		430 U	*	25 J		400 U	*
Butylbenzylphthalate	400 U		380 UJv		380 U	*	100 J		430 U	*	53 J		56	*
3,3'-Dichlorobenzidine	400 U		380 UJv		380 U	*	430 UJv		430 U	*	400 UJv		400 U	*
Benzo(a)anthracene	400 U		300 J		280	*	90 J		430 U	*	400 UJv		400 U	*
Chrysene	400 U		690 J		670	*	430 UJv		110	*	41 J		40	*
bis(2-Ethylhexyl)phthalate	400 U		380 UJv		380 U	*	430 UJv		430 U	*	400 UJv		62	*
Di-n-octylphthalate	400 U		380 UJv		380 U	*	27 J		430 U	*	400 UJv		400 U	*
Benzo(b)fluoranthene	400 U		230 J		210	*	430 UJv		430 U	*	400 UJv		400 U	*
Benzo(k)fluoranthene	400 U		380 UJv		58	*	430 UJv		430 U	*	400 UJv		400 U	*
Benzo(a)pyrene	400 U		250 J		240	*	150 J		160	*	400 UJv		400 U	*
Indeno(1,2,3-cd)pyrene	400 U		380 UJv		380 U	*	430 UJv		430 U	*	400 UJv		400 U	*
Dibenz(a,h)anthracene	400 U		380 UJv		380 U	*	430 UJv		430 U	*	400 UJv		400 U	*
Benzo(g,h,i)perylene	400 U		440 J		380 U	*	430 UJv		430 U	*	400 UJv		400 U	*
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	18		13		13		24		24		18		18	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:	22		35		35		35		35		29		22	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G18	FF-G18RE	FF-G21	FF-G21RE	FF-G22	FF-G22RE	FF-G23
Phenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethyl)ether	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Chlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,3-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,4-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,2'-Oxybis(1-chloropropane)	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
N-Nitroso-di-n-propylamine	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachloroethane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Nitrobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Isophorone	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Nitrophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dimethylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethoxy)methane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dichlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2,4-Trichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Naphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloroaniline	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorobutadiene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloro-3-methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylnaphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorocyclopentadiene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,6-Trichlorophenol	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,5-Trichlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
2-Chloronaphthalene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dimethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Acenaphthylene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,6-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
3-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Acenaphthene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4-Nitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dibenzofuran	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Diethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Chlorophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Fluorene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4,6-Dinitro-2-methylphenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
N-Nitrosodiphenylamine	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
4-Bromophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Hexachlorobenzene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Pentachlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
Phenanthrene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	35 J
Anthracene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U

5615899

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G18		FF-G18RE		FF-G21		FF-G21RE		FF-G22		FF-G22RE		FF-G23	
Carbazole	400	U	400	U *	400	U	400	U *	400	UJv	400	U *	400	U
Di-n-butylphthalate	400	U	400	U *	30	J	27	*	400	UJv	400	U *	400	U
Fluoranthene	400	U	400	U *	400	U	400	U *	400	UJv	400	U *	400	U
Pyrene	38	J	400	U *	25	J	400	U *	400	UJv	400	U *	94	J
Butylbenzylphthalate	45	J	51	*	35	J	400	U *	400	UJv	400	U *	59	J
3,3'-Dichlorobenzidine	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Benzo(a)anthracene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Chrysene	26	J	26	*	22	J	400	U *	400	UJv	400	U *	82	J
Bis(2-Ethylhexyl)phthalate	400	UJv	83	*	400	UJv	87	*	400	UJv	400	U *	400	UJv
Di-n-octylphthalate	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Benzo(b)fluoranthene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	31	J
Benzo(k)fluoranthene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	26	J
Benzo(a)pyrene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	54	J
Indeno(1,2,3-cd)pyrene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	51	J
Dibenz(a,h)anthracene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	26	J
Benzo(g,h,i)perylene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	190	J
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	18		18		18		18		18		18		18	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:	25		17		27		19		31		26		26	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G23RE							
Phenol	400 U	*						
bis(2-Chloroethyl)ether	400 U	*						
2-Chlorophenol	400 U	*						
1,3-Dichlorobenzene	400 U	*						
1,4-Dichlorobenzene	400 U	*						
1,2-Dichlorobenzene	400 U	*						
2-Methylphenol	400 U	*						
2,2'-Oxybis(1-chloropropane)	400 U	*						
4-Methylphenol	400 U	*						
N-Nitroso-di-n-propylamine	400 U	*						
Hexachloroethane	400 U	*						
Nitrobenzene	400 U	*						
Isophorone	400 U	*						
2-Nitrophenol	400 U	*						
2,4-Dimethylphenol	400 U	*						
bis(2-Chloroethoxy)methane	400 U	*						
2,4-Dichlorophenol	400 U	*						
1,2,4-Trichlorobenzene	400 U	*						
Naphthalene	400 U	*						
4-Chloroaniline	400 U	*						
Hexachlorobutadiene	400 U	*						
4-Chloro-3-methylphenol	400 U	*						
2-Methylnaphthalene	400 U	*						
Hexachlorocyclopentadiene	400 U	*						
2,4,6-Trichlorophenol	400 U	*						
2,4,5-Trichlorophenol	1000 U	*						
2-Chloronaphthalene	400 U	*						
2-Nitroaniline	1000 U	*						
Dimethylphthalate	400 U	*						
Acenaphthylene	400 U	*						
2,6-Dinitrotoluene	400 U	*						
3-Nitroaniline	1000 U	*						
Acenaphthene	400 U	*						
2,4-Dinitrophenol	1000 U	*						
4-Nitrophenol	1000 U	*						
Dibenzofuran	400 U	*						
2,4-Dinitrotoluene	400 U	*						
Diethylphthalate	400 U	*						
4-Chlorophenyl-phenylether	400 U	*						
Fluorene	400 U	*						
4-Nitroaniline	1000 U	*						
4,6-Dinitro-2-methylphenol	1000 U	*						
N-Nitrosodiphenylamine	400 U	*						
4-Bromophenyl-phenylether	400 U	*						
Hexachlorobenzene	400 U	*						
Pentachlorophenol	1000 U	*						
Phenanthrene	35	*						
Anthracene	400 U	*						

5615901

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G23RE							
Carbazole	400 U	*						
Di-n-butylphthalate	28	*						
Fluoranthene	23	*						
Pyrene	90	*						
Butylbenzylphthalate	81	*						
3,3'-Dichlorobenzidine	400 U	*						
Benzo(a)anthracene	400 U	*						
Chrysene	77	*						
bis(2-Ethylhexyl)phthalate	79	*						
Di-n-octylphthalate	400 U	*						
Benzo(b)fluoranthene	35	*						
Benzo(k)fluoranthene	41	*						
Benzo(a)pyrene	60	*						
Indeno(1,2,3-cd)pyrene	29	*						
Dibenz(a,h)anthracene	400 U	*						
Benzo(g,h,i)perylene	110	*						
Sample wt (g):	30							
%Moisture:	18							
Dilution Factor:	1							
Level:	LOW							
Number of TIC's:	35							

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G02	FF-G03	FF-G04	FF-G05	FF-G06	FF-G07	FF-G08
alpha-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
beta-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
delta-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
gamma-BHC (lindane)	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Heptachlor	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Aldrin	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Heptachlor epoxide	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Endosulfan I	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Dieldrin	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDE	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endrin	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endosulfan II	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDD	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endosulfan sulfate	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDT	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Methoxychlor	21 U	20 U	22 U	21 U	22 U	23 U	22 U
Endrin ketone	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endrin aldehyde	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
alpha-Chlordane	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
gamma-Chlordane	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Toxaphene	210 U	200 U	220 U	210 U	220 U	230 U	220 U
Aroclor-1016	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1221	82 U	80 U	85 U	83 U	86 U	99 U	87 U
Aroclor-1232	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1242	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1248	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1254	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1260	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	16	21	19	22	25	23
Dilution Factor:	1	1	1	1	1	1	1

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

C915903

2/12/04

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G09	FF-G10	FF-G11	FF-G12	FF-G13	FF-G14	FF-G15
alpha-BHC	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
beta-BHC	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
delta-BHC	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
gamma-BHC (lindane)	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
Heptachlor	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.5	2.0 U
Aldrin	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
Heptachlor epoxide	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
Endosulfan I	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	2.0 U
Dieldrin	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	3.8 U
4,4'-DDE	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	3.8 U
Endrin	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	7.5 J
Endosulfan II	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	7.9
4,4'-DDD	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	3.8 U
Endosulfan sulfate	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	10 UJ
4,4'-DDT	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	3.8 U
Methoxychlor	24 U	21 U	21 U	21 U	20 U	21 U	20 U
Endrin ketone	4.6 U	4.0 U	4.1 U	4.1 U	3.8 U	4.0 U	14 J
Endrin aldehyde	4.6 U	4.0 U	4.1 U	4.7 U	3.8 U	4.0 U	3.8 U
alpha-Chlordane	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	3.6 J
gamma-Chlordane	2.4 U	2.1 U	2.1 U	2.1 U	2.0 U	2.1 U	5.7
Toxaphene	240 U	210 U	210 U	210 U	200 U	210 U	200 U
Aroclor-1016	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Aroclor-1221	94 U	82 U	83 U	84 U	78 U	82 U	77 U
Aroclor-1232	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Aroclor-1242	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Aroclor-1248	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Aroclor-1254	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Aroclor-1260	46 U	40 U	41 U	41 U	38 U	40 U	38 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	29	18	19	20	14	18	13
Dilution Factor:	1	1	1	1	1	1	1

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G16		FF-G17		FF-G18		FF-G21		FF-G22		FF-G23	
alpha-BHC	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
beta-BHC	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
delta-BHC	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
gamma-BHC (lindane)	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
Heptachlor	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
Aldrin	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
Heptachlor epoxide	2.2	U	2.1		2.9		2.1	U	2.1	U	2.1	U
Endosulfan I	2.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
Dieldrin	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
4,4'-DDE	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Endrin	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Endosulfan II	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
4,4'-DDD	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Endosulfan sulfate	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	5.6	UJ
4,4'-DDT	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Methoxychlor	22	U	21	U	21	U	21	U	21	U	21	U
Endrin ketone	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Endrin aldehyde	4.3	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
alpha-Chlordane	2.2	U	2.2	J	3.6	J	2.1	U	2.1	U	2.1	U
gamma-Chlordane	2.2	U	2.8	UJ	5.9	B	2.1	U	2.1	U	2.1	U
Toxaphene	220	U	210	U	210	U	210	U	210	U	210	U
Aroclor-1016	43	U	40	U	40	U	40	U	40	U	40	U
Aroclor-1221	88	U	82	U	82	U	82	U	82	U	82	U
Aroclor-1232	43	U	40	U	40	U	40	U	40	U	40	U
Aroclor-1242	43	U	40	U	40	U	40	U	40	U	40	U
Aroclor-1248	43	U	40	U	40	U	40	U	40	U	40	U
Aroclor-1254	43	U	40	U	40	U	40	U	40	U	40	U
Aroclor-1260	43	U	40	U	40	U	40	U	40	U	40	U
Sample wt (g):	30		30		30		30		30		30	
%Moisture:	24		18		18		18		18		18	
Dilution Factor:	1		1		1		1		1		1	

5615905

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 25159 SDG No. FFG02 SDG Nos. To Follow SAS No. Date Rec 12/27/96

EPA Lab ID: AATS

Lab Location: Broken Arrow, OK 74012

Region: 6 Audit No.: 25159/FFG02

Re_Submitted CSF? Yes ____ No X

Box No(s): 1

COMMENTS:

3 The reviewer clarified the numbering scheme as follows:
SDG narrative was pages 1-35B;
SDG cover sheet/TR were pages 35C-38;
Forms VIII VOA were pages 362-367; and
VOA standards data were pages 178-361.

13 No airbills were available as the samples were delivered in person.

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?		X	
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?			X
14. Signed?			X
15. Dated?			X
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: Maria Missler Maria Missler / ESAT Data Reviewer Date 1/2/97

Audited by: ____ ____ Date ____

Audited by: ____ ____ Date ____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature Printed Name/Title

In Reference to Case No(s):
25159 SDG: FFG02 (O-1780)

5615907

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Date of FAX: January 10, 1997
Laboratory Name: AATS
Lab Contact: Harry Borg

Region: 6
Regional Contact: Maria Missler - ESAT

FAX initiated by: _____Laboratory ___X___Region

In reference to data for the following fractions:

BNA Pest/PCB

Summary of Questions/Issues:

A. BNA

1. Sample FF-G11, Form I SV-TIC: The TIC's at 22.326 and 22.595 min. were assigned the same CAS number and compound name. Please revise and resubmit this form.

2. Sample FF-G17RE, Form I SV-TIC: The TIC's at 12.764 and 13.089 min. were assigned the same CAS number and compound name. Please revise and resubmit this form.

3. Sample FF-G16: On the quantitation report, the peak identified as benzo(a)anthracene better matches the retention time identification criteria for chrysene. Please correct and resubmit the quantitation and results reports.

4. The following peaks appear to meet the TIC intensity criteria but were not reported. Please revise Forms I SV-TIC to include these peaks or explain:

Sample	Approximate peak RT (min)
FF-G03	11.4, 12.0
FF-G04	4.95, 11.7, 12.2
FF-G07	4.4
FF-G10	7.6

5. Form V SV, page 464: According to the analysis log (page 2682), the sample analyzed on 12/12/96 at 0029 was identified as "FF-G01", not FF-G06 as reported on this form. Please clarify this discrepancy.

FAX COMMUNICATION LOG

Continuation Page 2
Laboratory/Contact AATS / Harry Borg
In Reference To Case No. 25159 **SDG:** FFG02

B. Pest/PCB

1. Forms VI PEST-2, pages 2327, 2328, 2329, and 2330: The reviewer was unable to reproduce the calibration factors reported for the two surrogates based on the raw data (pages 2396-2409 and 2449-2462). Please correct and resubmit these forms to match the raw data or demonstrate your calculations.

2. Method blank PBLKSC, page 2490: According to the SOW (OLM03.0, D-73/PEST, 12.1.2.4) the method blank acceptance criteria apply independently to each analytical column. The integration report (page 2490) shows the presence of endosulfan sulfate on column DB-17 above the CRQL. Please comment on this non-compliance.

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (OLM03.0, p. B-29), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately **within 7 days** to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (713) 988-2995.

Maria Klisser
Signature

January 10, 1997
Date

Distribution: (1) Lab Copy (2) Region Copy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
EPA HOUSTON LABORATORY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

5615909

RESUBMITTED DATA REVIEW REPORT

DATE: January 29, 1997

TO: L. Biasco, 6SF-RA
USEPA Region 6

From: Mervin Doucet
ESAT

CASE #: 25159

SDG #: MFGZ66

Site Name: WILCOX OIL

Lab Name: ARI

TDF #: 6-7129A

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Response to Region Request (Received 1/24/97):

The resubmitted information does not affect the original data review. The laboratory resubmitted all requested explanations, forms, and raw data. Please place the resubmitted material in the data package.

Response to CCS Request (Received 1/24/97):

The resubmitted information does not affect the original data review. The laboratory submitted explanations and resubmitted data requested by CCS. Pages 53 through 84 can be discarded because they were already submitted in the Region's resubmission. Please place the remaining resubmitted material in the data package.

I2077

Analytical Resources, Incorporated
Analytical Chemists and Consultants

23 January 1997

5615910

Mahmoud El-Feky
USEPA Region VI
10625 Fallstone Road
Houston, TX 77099

RE: ESAT review of Complete SDG File (CSF)
CLP Case #25159 - SDG#MFGZ66

Dear Mr. El-Feky:

Please find enclosed ARI's response to the comments generated during the above referenced CSF review. The following is a question by question response:

Question/Issue #1 - The person who compiled the documents forgot to put the sample tag in a plastic bag. This contract deviation has been noted for future Region 6 cases.

Question/Issue #2 - Corrected Form 14 is enclosed.

Question/Issue #3 - Corrected Form 14 is enclosed.

Question/Issue #4 - Corrected Form 14 and corrected raw data are enclosed.

If you have any additional questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Jeff J. Reitan
Project Manager
jeff@arilabs.com

enclosure

333 Ninth Avenue North • Seattle WA 98109-5187 • **206-621-6490** • **206-621-7523** fax

Lockheed Martin Services Group
ESAT Region 6

One Sterling Plaza, 10101 Southwest Freeway, Suite 500
Houston, TX 77074 TEL:(713) 988-2959

5615911

FACSIMILE COVER SHEET

Please deliver the following pages to:

Name Paul Jay Kuhn

Firm ARI

City Seattle **State** WA

Telephone 206-621-6490 **Ext.** _____

Fax Telephone No. 206-621-7523 **Ext.** _____

Sender:

Name Mervin Doucet ESAT

Date January 17, 1997 **Time** _____

Total Number of pages including this Cover Sheet 2

If you do not receive all the pages or if any pages are unclear, please call: (713) 988-2959

MESSAGES: _____

Fax No. (713) 988-2994

Case 25159 SDG MFGZ66
Page 1 of 1
ESAT FILE NO.: I2077

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

5615912

Date of FAX: January 17, 1997

Laboratory Name: ARI

Lab Contact: Paul Jay Kuhn

Region: 6

Regional Contact: Mervin Doucet (ESAT)

FAX Initiated by: Region

In reference to data for the following sample number:

MFG-Z66

Summary of Questions/Issues:

1. The sample tag was not sealed in a plastic bag (SOW ILM04.0, page B-13, F.3.d). Please submit an acknowledgement of this contractual deviation and note for future reference.

2. According to the raw data (page 271), the selenium analysis time on the Form 14 (page 53) for sample MFG-Z66 should be 15:33. Please resubmit the corrected Form 14.

3. According to the raw data (page 286), the mercury analysis times for most standards do not match the analysis times on the Form 14 (page 55). Please make the necessary corrections and resubmit.

4. According to the raw data (pages 80-84), the ICP analysis times for all standards do not match the analysis times on the Form 14 (page 53). Please make the necessary corrections and resubmit.

EPA expects the laboratory to look into items and submit data within seven days to Mahmoud El-Feky, U.S. EPA, 10625 Fallstone Road, Houston TX 77099.

Mervin L Doucet
Signature

1/17/97
Date

Distribution: (1) Lab Copy (2) Region Copy

U.S. EPA - CLP

14
ANALYSIS RUN LOG

5615913

Lab Name: ANALYTICAL_RESOURCES_INC. Contract: 68D50134__

Lab Code: ARI___ Case No.: 25159_ SAS No.: _____ SDG No.:MFGZ66

Instrument ID Number: VARIAN1 300 _ Method: F_

Start Date: 12/14/96 End Date: 12/14/96

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1450																		X						
ZZZZZZ	1.00	1455																								
ZZZZZZA	1.00	1500	90.0																							
ZZZZZZ	1.00	1504																								
ZZZZZZA	1.00	1509	60.0																							
ZZZZZZ	1.00	1514																								
ZZZZZZA	1.00	1518	63.0																							
ZZZZZZ	1.00	1523																								
ZZZZZZA	1.00	1528	91.0																							
MFGZ66	1.00	1533																		X						
MFGZ66A	1.00	1537	92.0																	X						
CCV	1.00	1542																		X						
CCB	1.00	1547																		X						
S0	1.00	1552																		X						
CCV	1.00	1557																		X						
CCB	1.00	1601																		X						
MFGZ66D	1.00	1606																		X						
MFGZ66DA	1.00	1610	98.0																	X						
MFGZ66S	1.00	1615																		X						
MFGZ66SA	1.00	1619	94.0																	X						
PBS	1.00	1624																		X						
PBSA	1.00	1628	107.0																	X						
LCSS	10.00	1633																		X						
LCSSA	10.00	1637	83.0																	X						
CCV	1.00	1642																		X						
CCB	1.00	1646																		X						

FORM XIV - IN ILM04.0

000053

01/17/97

U.S. EPA - CLP

14
ANALYSIS RUN LOG

5615914

Lab Name: ANALYTICAL_RESOURCES_INC. Contract: 68D50134__

Lab Code: ARI___ Case No.: 25159_ SAS No.: _____ SDG No.:MFGZ66

Instrument ID Number: BUCK MERCURY_ Method: CV

Start Date: 12/04/96 End Date: 12/04/96

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1338																X								
S0.2	1.00	1340																X								
S0.5	1.00	1342																X								
S1	1.00	1343																X								
S5	1.00	1346																X								
S10	1.00	1347																X								
ICV	1.00	1351																X								
ICB	1.00	1353																X								
CCV	1.00	1354																X								
CCB	1.00	1356																X								
CRA	1.00	1358																X								
ZZZZZZ	1.00	1400																								
ZZZZZZ	5.00	1402																								
ZZZZZZ	1.00	1405																								
ZZZZZZ	1.00	1406																								
ZZZZZZ	1.00	1408																								
ZZZZZZ	1.00	1421																								
ZZZZZZ	1.00	1423																								
ZZZZZZ	1.00	1425																								
ZZZZZZ	1.00	1427																								
CCV	1.00	1429																X								
CCB	1.00	1431																X								
CCV	1.00	1442																X								
CCB	1.00	1444																X								
ZZZZZZ	1.00	1447																								
ZZZZZZ	1.00	1449																								
ZZZZZZ	1.00	1451																								
ZZZZZZ	1.00	1453																								
ZZZZZZ	1.00	1455																								
ZZZZZZ	1.00	1457																								
ZZZZZZ	1.00	1459																								
ZZZZZZ	1.00	1501																								

FORM XIV - IN 000055 ILM04.0

01/17/97

12-15-96
CGH

TJA ICP 61

BH 01/17/97

Standardization Rpt. SO Sun 12-15-96 ~~01:22:53~~ 1320 PM Page 1

5615915

Method: ICPCLP1 Standard: STD1-Blank

Elem	AG	AL	AS	B	BA	BE	CA
Avge	-.0390	.4552	.0676	.0229	.0019	.0929	.0371
SDev	.0041	.0266	.0216	.0029	.0008	.0014	.0029
%RSD	10.56	5.832	31.99	12.50	43.30	1.538	7.692
#1	-.0343	.4429	.0429	.0257	.0029	.0914	.0400
#2	-.0414	.4857	.0771	.0200	.0014	.0943	.0371
#3	-.0414	.4371	.0829	.0229	.0014	.0929	.0343

Elem	CD	CO	CR	CU	FE	K	MG
Avge	.0205	.0067	.0071	.0486	.0195	-.1552	.0048
SDev	.0030	.0030	.0014	.0029	.0109	.0246	.0060
%RSD	14.52	44.61	20.00	5.882	55.89	15.84	124.9
#1	.0229	.0057	.0071	.0486	.0171	-.1271	.0029
#2	.0214	.0100	.0057	.0514	.0314	-.1657	.0114
#3	.0171	.0043	.0086	.0457	.0100	-.1729	.0000

Elem	MN	MO	NA	NI	PB	SB	SE
Avge	.0019	.0029	.5867	-.0686	.0129	.0548	.0238
SDev	.0008	.0029	.0208	.0029	.0124	.0064	.0060
%RSD	43.30	100.0	3.548	4.167	96.86	11.76	24.98
#1	.0014	.0000	.6100	-.0714	.0071	.0543	.0171
#2	.0029	.0029	.5700	-.0657	.0043	.0614	.0257
#3	.0014	.0057	.5800	-.0686	.0271	.0486	.0286

Elem	SI	SN	SR	TI	TL	V	ZN
Avge	.1529	-.0033	.0629	.0129	-.0886	-.0248	.0119
SDev	.0043	.0064	.0000	.0000	.0311	.0064	.0008
%RSD	2.804	193.3	.0000	.0000	35.15	26.01	6.928
#1	.1571	-.0029	.0629	.0129	-.1029	-.0243	.0114
#2	.1529	.0029	.0629	.0129	-.0529	-.0186	.0114
#3	.1486	-.0100	.0629	.0129	-.1100	-.0314	.0129

000080 BH 01/17/97

RA 01/17/97

1323

Standardization Rpt. S Sun 12-15-96 01:~~26~~:45 PM page 1

Method: ICPCLP1 Standard: STD2

5615916

Elem	BA	CA	CD	CO	CR	CU	MN
Avge	52.48	23.67	55.15	25.29	16.91	61.41	30.10
SDev	.16	.07	.13	.10	.05	.22	.08
%RSD	.3103	.2942	.2424	.3785	.2854	.3653	.2747
#1	52.66	23.74	55.28	25.39	16.95	61.64	30.17
#2	52.44	23.68	55.16	25.29	16.92	61.41	30.13
#3	52.35	23.60	55.01	25.19	16.86	61.19	30.01

Elem	V
Avge	63.46
SDev	.32
%RSD	.5100
#1	63.76
#2	63.50
#3	63.12

BH 01/17/97

000081

01/17/97

1328

Standardization Rpt. S Sun 12-15-96 ~~01:33~~:03 PM

Method: ICPCLP1 Standard: STD5

Elem	K
Avge	12.77
SDev	.05
%RSD	.4121
#1	12.83
#2	12.74
#3	12.73

5615917

000082

01/17/97

01/17/97

Standardization Rpt. S Sun 12-15-96 01~~:37~~1333:42 PM page 1

Method: ICPCLP1 Standard: STD4

Elem	MO	SB	SI	SN	TI
Avge	21.28	18.06	28.68	10.81	55.77
SDev	.03	.11	.18	.03	.37
%RSD	.1622	.5859	.6345	.3107	.6551
#1	21.32	18.16	28.88	10.85	56.19
#2	21.25	18.06	28.61	10.80	55.61
#3	21.28	17.95	28.54	10.79	55.51

5615918

000083 01/17/97

01/07/97

Standardization Rpt. 5 Sun 12-15-96 01~~:42~~:1337 43 PM pa

Method: ICPCLP1 Standard: STD3

Elem	AG	AL	AS	B	BE	FE	MG
Avge	3.336	29.52	10.50	24.35	166.4	24.87	7.388
SDev	.011	.11	.07	.14	.6	.08	.028
%RSD	.3233	.3712	.6696	.5843	.3784	.3290	.3781
#1	3.324	29.39	10.43	24.19	165.7	24.78	7.380
#2	3.346	29.59	10.57	24.40	166.8	24.90	7.419
#3	3.337	29.57	10.51	24.46	166.7	24.94	7.364

Elem	NA	NI	PB	SE	SR	TL	ZN
Avge	44.83	52.41	13.43	7.482	48.70	10.86	9.844
SDev	.16	.27	.04	.027	.20	.06	.014
%RSD	.3617	.5209	.3057	.3629	.4043	.5095	.1454
#1	44.65	52.11	13.40	7.454	48.47	10.80	9.830
#2	44.97	52.64	13.41	7.509	48.82	10.91	9.843
#3	44.86	52.49	13.47	7.483	48.80	10.87	9.859

000084 01/7/97

5615920

MD

COVER SHEET

LABORATORY RESPONSE TO RESULTS OF CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check One) _____ Organic CCS

_✓_ Inorganic CCS

Response materials should be sent to the attention of the CCS Coordinator.

Labcode: ARI Response Date: 1/23/97

Date Screening Results Received at Laboratory: 1/10/97

EPA Contract No. 68-D5-0134

Case No. 25159

SDG No. MFGZ66

Sample Nos.*

*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each SDG.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.

LABORATORY RESPONSE TO RESULTS OF CCS

CRITERION	COMMENTS
1A17.2	Raw data average is incorrect: This is a rounding problem with our CLP reporting software, which the supplier, to date has been unwilling to fix
AA36	Replicate injections not performed: Yes They were They just are not in the ~~raw~~ EDD. Our software supplier & instrument manufacturer are working on this problem.
ABD5.2	EDD problem - raw data and forms correct.
ACC03.2	EDD error - raw data and forms correct.
AF01.1	EDD error - raw data and forms are correct.
AF01.3	EDD error - raw data and forms are correct.
AF03.2	EDD error - raw data and forms are correct.
AG04.2	Spike added is incorrect: Yes for CN the sample was spiked at 150 ug/L not 100 ug/L. This is an error and is not contract compliant.
AG05.2	EDD error
AH04	EDD error
AI04.1	EDD error
AI06.1	EDD error
AJ05.2	EDD error
AK06.2	EDD error
AL06	EDD error

LABORATORY RESPONSE TO RESULTS OF CCS

5615922

CRITERION	COMMENTS
AQOB	EDD error - raw data and forms are correct.
AQ18	yes there were 11 samples run between CV/CB pairs this is not contrictenf so all the samples were re-run. all of the data is not "X"ed on form 14 because of this.
~~A~~ AQ37	Sample was high on the ICP for Pb - so based on this info the samples was ~~pre~~ diluted at 2X for GFA. The 2X dilution was over range so the sample was then run at 5X for quantitation.
MDi	All corrected raw data and forms have been resubmitted

U.S. EPA - CLP

14
ANALYSIS RUN LOG

5615923

Lab Name: ANALYTICAL_RESOURCES_INC. Contract: 68D50134__

Lab Code: ARI___ Case No.: 25159_ SAS No.: _____ SDG No.:MFGZ66

Instrument ID Number: VARIAN1 300 _ Method: F_

Start Date: 12/14/96 End Date: 12/14/96

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1450																		X						
ZZZZZZ	1.00	1455																								
ZZZZZZA	1.00	1500	90.0																							
ZZZZZZ	1.00	1504																								
ZZZZZZA	1.00	1509	60.0																							
ZZZZZZ	1.00	1514																								
ZZZZZZA	1.00	1518	63.0																							
ZZZZZZ	1.00	1523																								
ZZZZZZA	1.00	1528	91.0																							
MFGZ66	1.00	1533																		X						
MFGZ66A	1.00	1537	92.0																	X						
CCV	1.00	1542																		X						
CCB	1.00	1547																		X						
S0	1.00	1552																		X						
CCV	1.00	1557																		X						
CCB	1.00	1601																		X						
MFGZ66D	1.00	1606																		X						
MFGZ66DA	1.00	1610	98.0																	X						
MFGZ66S	1.00	1615																		X						
MFGZ66SA	1.00	1619	94.0																	X						
PBS	1.00	1624																		X						
PBSA	1.00	1628	107.0																	X						
LCSS	10.00	1633																		X						
LCSSA	10.00	1637	83.0																	X						
CCV	1.00	1642																		X						
CCB	1.00	1646																		X						

Q800853 BH 01/17/97

U.S. EPA - CLP

14
ANALYSIS RUN LOG

5615924

Lab Name: ANALYTICAL_RESOURCES_INC. Contract: 68D50134__

Lab Code: ARI___ Case No.: 25159_ SAS No.: _____ SDG No.:MFGZ66

Instrument ID Number: BUCK MERCURY_ Method: CV

Start Date: 12/04/96 End Date: 12/04/96

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1338																X								
S0.2	1.00	1340																X								
S0.5	1.00	1342																X								
S1	1.00	1343																X								
S5	1.00	1346																X								
S10	1.00	1347																X								
ICV	1.00	1351																X								
ICB	1.00	1353																X								
CCV	1.00	1354																X								
CCB	1.00	1356																X								
CRA	1.00	1358																X								
ZZZZZZ	1.00	1400																								
ZZZZZZ	5.00	1402																								
ZZZZZZ	1.00	1405																								
ZZZZZZ	1.00	1406																								
ZZZZZZ	1.00	1408																								
ZZZZZZ	1.00	1421																								
ZZZZZZ	1.00	1423																								
ZZZZZZ	1.00	1425																								
ZZZZZZ	1.00	1427																								
CCV	1.00	1429																X								
CCB	1.00	1431																X								
CCV	1.00	1442																X								
CCB	1.00	1444																X								
ZZZZZZ	1.00	1447																								
ZZZZZZ	1.00	1449																								
ZZZZZZ	1.00	1451																								
ZZZZZZ	1.00	1453																								
ZZZZZZ	1.00	1455																								
ZZZZZZ	1.00	1457																								
ZZZZZZ	1.00	1459																								
ZZZZZZ	1.00	1501																								

01/17/97

12-15-96
CLP

IJA 1/4/97

BH 01/17/97

Standardization Rpt. SO Sun 12-15-96 ~~01:22:53~~ 1320 PM page

5615925

Method: ICPCLP1 Standard: STD1-Blank

Elem	AG	AL	AS	B	BA	BE	CA
Avge	-.0390	.4552	.0676	.0229	.0019	.0929	.0371
SDev	.0041	.0266	.0216	.0029	.0008	.0014	.0029
%RSD	10.56	5.832	31.99	12.50	43.30	1.538	7.692
#1	-.0343	.4429	.0429	.0257	.0029	.0914	.0400
#2	-.0414	.4857	.0771	.0200	.0014	.0943	.0371
#3	-.0414	.4371	.0829	.0229	.0014	.0929	.0343

Elem	CD	CO	CR	CU	FE	K	MG
Avge	.0205	.0067	.0071	.0486	.0195	-.1552	.0048
SDev	.0030	.0030	.0014	.0029	.0109	.0246	.0060
%RSD	14.52	44.61	20.00	5.882	55.89	15.84	124.9
#1	.0229	.0057	.0071	.0486	.0171	-.1271	.0029
#2	.0214	.0100	.0057	.0514	.0314	-.1657	.0114
#3	.0171	.0043	.0086	.0457	.0100	-.1729	.0000

Elem	MN	MO	NA	NI	PB	SB	SE
Avge	.0019	.0029	.5867	-.0686	.0129	.0548	.0238
SDev	.0008	.0029	.0208	.0029	.0124	.0064	.0060
%RSD	43.30	100.0	3.548	4.167	96.86	11.76	24.98
#1	.0014	.0000	.6100	-.0714	.0071	.0543	.0171
#2	.0029	.0029	.5700	-.0657	.0043	.0614	.0257
#3	.0014	.0057	.5800	-.0686	.0271	.0486	.0286

Elem	SI	SN	SR	TI	TL	V	ZN
Avge	.1529	-.0033	.0629	.0129	-.0886	-.0248	.0119
SDev	.0043	.0064	.0000	.0000	.0311	.0064	.0008
%RSD	2.804	193.3	.0000	.0000	35.15	26.01	6.928
#1	.1571	-.0029	.0629	.0129	-.1029	-.0243	.0114
#2	.1529	.0029	.0629	.0129	-.0529	-.0186	.0114
#3	.1486	-.0100	.0629	.0129	-.1100	-.0314	.0129

000880 BH 01/17/97

RA 01/17/97

1323

Standardization Rpt. S Sun 12-15-96 01:28:45 PM page 1

Method: ICPCLP1 Standard: STD2

Elem	BA	CA	CD	CO	CR	CU	MN
Avge	52.48	23.67	55.15	25.29	16.91	61.41	30.1
SDev	.16	.07	.13	.10	.05	.22	.08
%RSD	.3103	.2942	.2424	.3785	.2854	.3653	.2747
#1	52.66	23.74	55.28	25.39	16.95	61.64	30.17
#2	52.44	23.68	55.16	25.29	16.92	61.41	30.13
#3	52.35	23.60	55.01	25.19	16.86	61.19	30.01

Elem	V
Avge	63.46
SDev	.32
%RSD	.5100
#1	63.76
#2	63.50
#3	63.12

5615926

000081 01/17/97

BH 01/17/97

1328

Standardization Rpt. S Sun 12-15-96 ~~01:33:~~03 PM page 1

5615927

Method: ICPCLP1 Standard: STD5

Elem	K
Avge	12.77
SDev	.05
%RSD	.4121
#1	12.83
#2	12.74
#3	12.73

000082 BH 01/17/97

BA 01/17/97

Standardization Rpt. S Sun 12-15-96 01~~:37~~1333:42 PM page

Method: ICPCLP1 Standard: STD4

5615928

Elem	MO	SB	SI	SN	TI
Avge	21.28	18.06	28.68	10.81	55.77
SDev	.03	.11	.18	.03	.37
%RSD	.1622	.5859	.6345	.3107	.6551
#1	21.32	18.16	28.88	10.85	56.19
#2	21.25	18.06	28.61	10.80	55.61
#3	21.28	17.95	28.54	10.79	55.51

000083 BA 01/17/97

BH 01/7/97

Standardization Rpt. 5 Sun 12-15-96 01~~:42:~~1337:43 PM page

Method: ICPCLP1 Standard: STD3

56:5329

Elem	AG	AL	AS	B	BE	FE	MG
Avge	3.336	29.52	10.50	24.35	166.4	24.87	7.388
SDev	.011	.11	.07	.14	.6	.08	.028
%RSD	.3233	.3712	.6696	.5843	.3784	.3290	.3781
#1	3.324	29.39	10.43	24.19	165.7	24.78	7.380
#2	3.346	29.59	10.57	24.40	166.8	24.90	7.419
#3	3.337	29.57	10.51	24.46	166.7	24.94	7.364

Elem	NA	NI	PB	SE	SR	TL	ZN
Avge	44.83	52.41	13.43	7.482	48.70	10.86	9.844
SDev	.16	.27	.04	.027	.20	.06	.014
%RSD	.3617	.5209	.3057	.3629	.4043	.5095	.1454
#1	44.65	52.11	13.40	7.454	48.47	10.80	9.830
#2	44.97	52.64	13.41	7.509	48.82	10.91	9.843
#3	44.86	52.49	13.47	7.483	48.80	10.87	9.859

000084 BH 01/7/97

5615330

SAMPLE	CONC	%RSD	MEAN ABS	READINGS
QCBLANK QC CCB 3	0.2	34.8	0.001	0.001 0.000 17Sep96 14:24 ABS = 0.003
BLANK QC S0	0.0		0.004	0.004 0.004 17Sep96 14:31
RESLOPE 3 QC S20	20.0	2.4	0.053	0.054 0.052 17Sep96 14:36
QCSTANDARD QC CCV 4	38.6	0.5	0.102	0.101 0.102 17Sep96 14:41 %R = 96.6
QCBLANK QC CCB 4	0.1	22.2	0.000	0.000 0.000 17Sep96 14:47 ABS = 0.004
MSA 5374 A 5 QC	~~12.6~~	~~24.2~~	~~0.036~~	0.030 MF6Z66-0 0.042 MF6Z66-1 17Sep96 14:52
~~QCSPIKE~~ QC	~~22.0~~	~~10.8~~ ~~E~~	~~0.056~~	0.054 MF6Z66-2 0.063 MF6Z66-3 17Sep96 14:58 ~~%R = 47.4~~ ~~%R FAILED. REPEAT BY STANDARD ADDITIONS~~
5374 ADUP 5 QC MFGZ66D	25.2	0.8	0.067	0.067 0.066 17Sep96 15:03
QCSPIKE QC MFGZ66DA	41.4	2.1 N	0.109	0.107 0.111 17Sep96 15:09 %R = 80.8 %R FAILED. REPEAT BY STANDARD ADDITIONS
CCV 5 ~~5375 ME 1~~ QC	39.1	1.4	0.103	0.102 0.104 17Sep96 15:14
CCB 5 ~~QCSPIKE~~ QC	0.4	~~19.7~~ ~~E~~	0.001	0.001 0.001 17Sep96 15:20 ~~%R = 173.5~~ ~~%R LESS THAN MINIMUM LIMIT~~
BLANK QC S0	0.0		-0.001	-0.001 -0.002 17Sep96 15:27
QCSTANDARD QC ~~S20~~ CCV 6	37.5	1.7	0.099	0.100 0.098 17Sep96 15:33 %R = 93.7
QCBLANK QC CCB 6	0.2	32.3	0.001	0.001 0.000 17Sep96 15:38 ABS = 0.004
MSA 5374 ADUP 10 QC	~~14.5~~	~~14.4~~	~~0.040~~	0.036 MF6Z66D-0 0.044 MF6Z66D-1 17Sep96 15:43
~~QCSPIKE~~ QC	~~22.8~~	~~10.9~~ ~~N~~	~~0.063~~	0.058 MF6Z66D-2 0.068 MF6Z66D-3 17Sep96 15:49 ~~%R = 46.4~~ ~~%R FAILED. REPEAT BY STANDARD ADDITIONS~~

Conc. = 13.7 ppb
r = 0.9978

Conc. = 15.7 ppb
r = 0.9951

BA 01/17/97

000255

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

5615931

RESUBMITTED DATA REVIEW REPORT

DATE :	January 24, 1997	CASE #:	25159
		SAS # :	
TO :	L. Biasco (6SF-RA)	SDG # :	FFG24
		LAB :	AATS
FROM :	Maria Missler (LMSG)	SITE :	Wilcox Oil
	ESAT - Region 6	TDF # :	
		ESAT #:	O-1787

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Laboratory response to Region 6 FAX request: (received 1/17/97)

A. VOA

1. Method blank VBLK3: The laboratory revised and resubmitted Form I VOA-TIC. Please replace page 138 with the resubmitted one.

B. Pest/PCB

1. The laboratory corrected and resubmitted Forms VI PEST-2. Please replace pages 397 and 398 with the resubmitted ones.

2. The laboratory corrected and resubmitted Forms VII PEST-1 and PEST-2. Please replace pages 406-411 with the resubmitted ones.

Please ignore resubmitted pages 470, 471, 474, and 475 as the reviewer did not request them.

16 January, 1997

561532

To:
Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

MM

From:
Laboratory Name: SWOK
Lab Contact: Harry Borg

Region: 6
Regional Contact: Maria Missler

In Reference to CASE No. 25159 SDG: FFG24

The Unknown compound has been added to TIC Form 1, pg. 138.

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

VBLK3 96.5933

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Matrix: (soil/water) WATER Lab Sample ID: L961126A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: L23525.D

Level: (low/med) LOW Date Received: / /

% Moisture: not dec. _____ Date Analyzed: 11/26/96

GC Column:DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

Number TICs found: 0 | AF 1-16-97

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	12.190	10	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

5615934

RESPONSE TO REGION REQUEST

DATE: January 14, 1997

TO: Maria Missler -- ESAT/Lockheed

FROM: Vicki L. Hall -- Southwest Laboratory of Oklahoma, Inc.

RE: Case 25159, SDG: FFG24

Pest/PCB:

RESPONSE 1:

The form VI PEST-2 have been corrected and resubmitted.

RESPONSE 2:

The forms VII PEST-1 and VII PEST-2 have been corrected and resubmitted.

All appropriate amendments are enclosed. If you have any further questions, please call me at (918) 251-2858.

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6E

PESTICIDE INITIAL CALIBRATION OF SINGLE COMPONENT ANALYTES

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Instrument ID: HP_16A Level (x low): low 1.0 mid 4.0 high 16.0

GC Column: DB-1701 ID: 0.32(mm) Date(s) Analyzed: 12/02/96 12/02/96

5615935

COMPOUND	CALIBRATION FACTORS LOW	MID	HIGH	MEAN	%RSD
alpha-BHC	17804400	18590700	20200050	18865050	6.5
beta-BHC	12695600	11328500	10528175	11517425	9.5
delta-BHC	16002800	16857100	18878425	17246108	8.6
gamma-BHC (Lindane)	17711200	17913600	18086275	17903692	1.0
Heptachlor	18478400	16293600	14236575	16336192	13.0
Aldrin	18326800	18787900	20929800	19348167	7.2
Heptachlor epoxide	18826800	18201800	19107425	18712008	2.5
Endosulfan I	17089600	16887200	16983600	16986800	0.6
Dieldrin	15963400	16918250	17492675	16791442	4.6
4,4'-DDE	16293000	17954050	19385325	17877458	8.7
Endrin	12516200	13143400	13201463	12953688	2.9
Endosulfan II	15326600	15323450	16305413	15651821	3.6
4,4'-DDD	12116800	13139200	12914463	12723488	4.2
Endosulfan sulfate	14367600	14530700	14704700	14534333	1.2
4,4'-DDT	10372400	10540600	9598113	10170371	4.9
Methoxychlor	5502080	4842570	4288588	4877746	12.5
Endrin ketone	15022200	15877800	16060425	15653475	3.5
Endrin aldehyde	12106200	13400850	13642588	13049879	6.3
alpha-Chlordane	18630000	17910700	18195325	18245342	2.0
gamma-Chlordane	19303600	18449900	19042825	18932108	2.3
Tetrachloro-m-xylene	20031200	19294700	18550025	19291975	3.8
Decachlorobiphenyl	21137800	18865800	16254263	18752621	13.0

* Surrogate calibration factors are measured from Standard Mix A analyses.

6E

PESTICIDE INITIAL CALIBRATION OF SINGLE COMPONENT ANALYTES

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Instrument ID: HP_16B Level (x low): low 1.0 mid 4.0 high 16.0

GC Column: DB-17 ID: 0.32(mm) Date(s) Analyzed: 12/02/96 12/02/96

COMPOUND	CALIBRATION FACTORS LOW	MID	HIGH	MEAN	%RSD
alpha-BHC	13567600	14215800	15820825	14534742	8.0
beta-BHC	8778400	8370200	8003200	8383933	4.6
delta-BHC	12332400	12466900	13862850	12887383	6.6
gamma-BHC (Lindane)	13163200	13143300	13506650	13271050	1.5
Heptachlor	13458800	11766700	10242425	11822642	13.6
Aldrin	14136000	14854100	17340175	15443425	10.9
Heptachlor epoxide	14519600	13832500	14759775	14370625	3.3
Endosulfan I	12994000	12876100	13352775	13074292	1.9
Dieldrin	11782800	12169400	12651888	12201363	3.6
4,4'-DDE	11944600	13416200	15611763	13657521	13.5
Endrin	8451800	8538650	8580088	8523513	0.8
Endosulfan II	12171000	12113000	12819275	12367758	3.2
4,4'-DDD	8691800	8876800	8866075	8811558	1.2
Endosulfan sulfate	11163800	11273500	11830525	11422608	3.1
4,4'-DDT	8179200	7966950	7578275	7908142	3.9
Methoxychlor	4613560	4115780	3474218	4067853	14.0
Endrin ketone	12554200	12838100	12953225	12781842	1.6
Endrin aldehyde	11459800	10697500	10358075	10838458	5.2
alpha-Chlordane	15329600	14507900	15240800	15026100	3.0
gamma-Chlordane	15680800	14862000	15809850	15450883	3.3
Tetrachloro-m-xylene	15190000	14979800	14698625	14956142	1.6
Decachlorobiphenyl	18757400	16637800	14544713	16646638	12.7

* Surrogate calibration factors are measured from Standard Mix A analyses.

7E

PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-1701 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): PIBLK16Q Date Analyzed : 12/02/96

Lab Sample ID (PIBLK): 5-266-1616Q Time Analyzed : 1546

EPA Sample No.(INDA): INDAM16M Date Analyzed : 12/02/96

Lab Sample ID (INDA): 5-261-1616M Time Analyzed : 1616

INDIVIDUAL MIX A COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.27	9.23	9.33	0.011	0.010	5.0
gamma-BHC (Lindane)	10.08	10.03	10.13	0.011	0.010	5.7
Heptachlor	10.46	10.41	10.51	0.010	0.010	3.8
Endosulfan I	12.82	12.76	12.90	0.010	0.010	1.9
Dieldrin	13.50	13.43	13.57	0.021	0.020	3.8
Endrin	13.89	13.82	13.96	0.021	0.020	4.3
4,4'-DDD	14.56	14.49	14.63	0.021	0.020	3.8
4,4'-DDT	14.86	14.79	14.93	0.020	0.020	0.7
Methoxychlor	16.04	15.97	16.11	0.101	0.100	0.9
Tetrachloro-m-xylene	7.40	7.35	7.45	0.010	0.010	4.2
Decachlorobiphenyl	19.57	19.47	19.67	0.020	0.020	-2.0

EPA Sample No.(INDB): INDBM16M Date Analyzed : 12/02/96

Lab Sample ID (INDB): 5-264-1616M Time Analyzed : 1646

INDIVIDUAL MIX B COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
beta-BHC	11.50	11.45	11.55	0.011	0.010	10.1
delta-BHC	11.95	11.90	12.00	0.011	0.010	11.1
Aldrin	10.98	10.93	11.03	0.011	0.010	9.7
Heptachlor epoxide	12.32	12.25	12.39	0.011	0.010	9.2
4,4'-DDE	13.14	13.07	13.21	0.022	0.020	10.4
Endosulfan II	14.75	14.69	14.83	0.023	0.020	12.9
Endosulfan sulfate	16.20	16.13	16.27	0.022	0.020	9.6
Endrin ketone	17.12	17.06	17.20	0.022	0.020	9.4
Endrin aldehyde	15.54	15.48	15.62	0.021	0.020	3.4
alpha-Chlordane	13.04	12.97	13.11	0.011	0.010	9.5
gamma-Chlordane	12.90	12.83	12.97	0.011	0.010	9.0
Tetrachloro-m-xylene	7.40	7.35	7.45	0.011	0.010	11.4
Decachlorobiphenyl	19.56	19.47	19.67	0.021	0.020	6.5

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PESTICIDE CALIBRATION VERIFICATION SUMMARY

5615938

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-17 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): PIBLK16Q Date Analyzed : 12/02/96

Lab Sample ID (PIBLK): 5-266-1616Q Time Analyzed : 1546

EPA Sample No.(INDA): INDAM16M Date Analyzed : 12/02/96

Lab Sample ID (INDA): 5-261-1616M Time Analyzed : 1616

INDIVIDUAL MIX A COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.58	9.53	9.63	0.010	0.010	4.6
gamma-BHC (Lindane)	10.43	10.38	10.48	0.011	0.010	5.9
Heptachlor	11.12	11.07	11.17	0.011	0.010	10.9
Endosulfan I	13.65	13.58	13.72	0.010	0.010	-1.0
Dieldrin	14.25	14.18	14.32	0.021	0.020	3.1
Endrin	14.98	14.91	15.05	0.021	0.020	3.7
4,4'-DDD	15.09	15.02	15.16	0.021	0.020	4.3
4,4'-DDT	15.72	15.65	15.79	0.020	0.020	-2.5
Methoxychlor	17.86	17.79	17.93	0.100	0.100	0.1
Tetrachloro-m-xylene	8.03	7.98	8.08	0.010	0.010	2.5
Decachlorobiphenyl	22.91	22.82	23.02	0.019	0.020	-3.5

EPA Sample No.(INDB): INDBM16M Date Analyzed : 12/02/96

Lab Sample ID (INDB): 5-264-1616M Time Analyzed : 1646

INDIVIDUAL MIX B COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
beta-BHC	10.57	10.52	10.62	0.011	0.010	12.5
delta-BHC	11.35	11.29	11.39	0.011	0.010	10.2
Aldrin	11.82	11.77	11.87	0.011	0.010	7.0
Heptachlor epoxide	12.94	12.87	13.01	0.011	0.010	7.5
4,4'-DDE	14.01	13.94	14.08	0.022	0.020	8.7
Endosulfan II	15.33	15.26	15.40	0.021	0.020	6.5
Endosulfan sulfate	16.30	16.23	16.37	0.021	0.020	7.1
Endrin ketone	18.46	18.39	18.53	0.022	0.020	7.4
Endrin aldehyde	16.02	15.95	16.09	0.021	0.020	6.5
alpha-Chlordane	13.57	13.50	13.64	0.011	0.010	5.7
gamma-Chlordane	13.26	13.19	13.33	0.011	0.010	6.2
Tetrachloro-m-xylene	8.03	7.98	8.08	0.011	0.010	9.6
Decachlorobiphenyl	22.91	22.82	23.02	0.021	0.020	5.9

7D

PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-1701 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): _____ Date Analyzed : _____

Lab Sample ID (PIBLK): _____ Time Analyzed : _____

EPA Sample No.(PEM): PEM16K Date Analyzed : 12/01/96

Lab Sample ID (PEM): 5-312-1616K Time Analyzed : 2247

PEM COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.28	9.23	9.33	0.005	0.005	-1.8
beta-BHC	11.50	11.45	11.55	0.005	0.005	-3.2
gamma-BHC (Lindane)	10.09	10.03	10.13	0.005	0.005	-2.7
Endrin	13.90	13.82	13.96	0.025	0.025	0.5
4,4'-DDT	14.86	14.79	14.93	0.042	0.050	-15.6
Methoxychlor	16.05	15.97	16.11	0.113	0.125	-9.5

4,4'-DDT % breakdown (1): 0.0 Endrin % breakdown (1): 0.0

Combined % breakdown (1): 0.0

406

7D

PESTICIDE CALIBRATION VERIFICATION SUMMARY

5615940

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-1701 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): PIBLK16P Date Analyzed : 12/02/96

Lab Sample ID (PIBLK): 5-266-1616P Time Analyzed : 0546

EPA Sample No.(PEM): PEM16L Date Analyzed : 12/02/96

Lab Sample ID (PEM): 5-312-1616L Time Analyzed : 0616

PEM COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.28	9.23	9.33	0.005	0.005	0.0
beta-BHC	11.50	11.45	11.55	0.005	0.005	2.3
gamma-BHC (Lindane)	10.08	10.03	10.13	0.005	0.005	1.7
Endrin	13.89	13.82	13.96	0.027	0.025	7.3
4,4'-DDT	14.86	14.79	14.93	0.045	0.050	-9.5
Methoxychlor	16.04	15.97	16.11	0.120	0.125	-3.4

4,4'-DDT % breakdown (1): 2.9 Endrin % breakdown (1): 0.0

Combined % breakdown (1): 2.9

7D

PESTICIDE CALIBRATION VERIFICATION SUMMARY

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-17 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): _____ Date Analyzed : _____

Lab Sample ID (PIBLK): _____ Time Analyzed : _____

EPA Sample No.(PEM): PEM16K Date Analyzed : 12/01/96

Lab Sample ID (PEM): 5-312-1616K Time Analyzed : 2247

PEM COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.58	9.53	9.63	0.005	0.005	-2.6
beta-BHC	10.57	10.52	10.62	0.005	0.005	-0.1
gamma-BHC (Lindane)	10.43	10.38	10.48	0.005	0.005	-1.9
Endrin	14.98	14.91	15.05	0.025	0.025	-0.4
4,4'-DDT	15.72	15.65	15.79	0.046	0.050	-8.2
Methoxychlor	17.86	17.79	17.93	0.115	0.125	-7.7

4,4'-DDT % breakdown (1): 0.0 Endrin % breakdown (1): 0.0

Combined % breakdown (1): 0.0

7D

PESTICIDE CALIBRATION VERIFICATION SUMMARY

5615942

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

GC Column: DB-17 ID: 0.32(mm) Init. Calib Date(s): 12/02/96 12/02/96

EPA Sample No.(PIBLK): PIBLK16P Date Analyzed : 12/02/96

Lab Sample ID (PIBLK): 5-266-1616P Time Analyzed : 0546

EPA Sample No.(PEM): PEM16L Date Analyzed : 12/02/96

Lab Sample ID (PEM): 5-312-1616L Time Analyzed : 0616

PEM COMPOUND	RT	RT WINDOW FROM	RT WINDOW TO	CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	9.58	9.53	9.63	0.005	0.005	-0.1
beta-BHC	10.57	10.52	10.62	0.005	0.005	7.6
gamma-BHC (Lindane)	10.43	10.38	10.48	0.005	0.005	2.2
Endrin	14.97	14.91	15.05	0.026	0.025	4.1
4,4'-DDT	15.72	15.65	15.79	0.048	0.050	-3.4
Methoxychlor	17.86	17.79	17.93	0.121	0.125	-2.8

4,4'-DDT % breakdown (1): 0.0 Endrin % breakdown (1): 0.0

Combined % breakdown (1): 0.0

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16P 61594 3

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616P

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16P 615944

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616P

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16Q

56159945

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616Q

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

474

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16Q

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG24

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616Q

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5615046

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

475

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 25159

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
—	—	6	Roy F. Weston	—	—

Regional Information	Sampler (Name)	Airbill Number
—	Eric Tate	—

Non-Superfund Program	Sampler Signature	5. Ship To
—	Eric Tate	AATS 1900 West Albany, Suite C Broken Arrow, OK 74012 (918) 251-2858 ATTN: Harry Berg

Site Name: Wilcox Oil

City, State: Bristow, OK

Site Spill ID: ZZ

3. Purpose*

Lead: [ ] SF [ ] PRP [ ] ST [ ] FED

Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [ ] SI [X] ESI

Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp. / Grab	D Preservative (from Box 7) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only	ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
FFG06	S	L	G	S	X	X	X			6-015017-19	SED05	11/19/96 1430	MFGZ48	ECT	—
FFG11	S	L	G	S	X	X	X			6-015037-39	SS01	11/19/96 1210	MFGZ53	ECT	—
FFG12	S	L	G	S	X	X	X			6-015041-43	SS02	11/19/96 1215	MFGZ54	ECT	—
FFG13	S	L	G	S	X	X	X			6-015045-47	SS03	11/19/96 1230	MFGZ55	ECT	—
FFG17	S	L	G	S	X	X	X			6-015061-63	SS07	11/19/96 1405	MFGZ59	ECT	—
FFG18	S	L	G	S	X	X	X			6-015065-67	SS08	11/19/96 1415	MFGZ60	ECT	D(FFG17)
FFG21	S	L	G	S	X	X	X			6-015077-79	SS11	11/19/96 1350	MFGZ63	ECT	—
FFG09	S	L	G	S	X	X	X			6-015029-31	SED08	11/19/96 1020	MFGZ51	ECT	—
FFG10	S	L	G	S	X	X	X			6-015033-35	SED09	11/19/96 1105	MFGZ52	ECT	—
FFG24	S	L	G	S	X	X	X			6-015089-91	SED10	11/19/96 1535	MFGZ66	ECT	—

Shipment for Case Complete? (Y/N)	Page (ect)	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
(Y) N	1 of 21	FFG24		

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Eric Tate	11/19/96 1800	Tim Rauch			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	
					5615947

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A21-012-15 REV.

3691077

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 25159

1. Project Code: —	Account Code: —	2. Region No.: 6	Sampling Co.: Roy F. Weston	4. Date Shipped: —	Carrier: —
Regional Information: —		Sampler (Name): Eric Tate		Airbill Number: —	
Non-Superfund Program: —		Sampler Signature: Eric Tate		5. Ship To: AATS, 1700 West Albany, Suite C, Broken Arrow, OK 74012, (918) 251-2858, ATTN: Harry Berg	
Site Name: Wilcox Oil		3. Purpose*: Lead: ☐ SF ☐ PRP ☐ ST ☐ FED; Early Action: ☐ CLEM ☐ PA ☐ REM ☐ RI ☐ SI ☒ ESI; Long-Term Action: ☐ FS ☐ RD ☐ RA ☐ O&M ☐ NPLD			
City, State: Bristow, OK	Site Spill ID: ZZ				

6. Matrix (Enter in Column A): 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Field QC; 5. Soil/Sediment; 6. Oil (High only); 7. Waste (High only); 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl; 2. HNO3; 3. NaHSO4; 4. H2SO4; 5. Ice only; 6. Other (Specify in Column D); N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E RAS Analysis: VOA	BNA	Pest/ PCB	High only / ARO/ TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
100 FF6 23	5	L	6	5	X	X	X		6-015085-87	SS13	11/18/96 1235	MFG265	ECT	D (FF6 22)

Shipment for Case Complete? (Y/N): N	Page: 2 of 2	Sample(s) to be Used for Laboratory QC: FF602	Additional Sampler Signatures:	Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Eric Tate	11/18/96 1830	Bryan Sudduth			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
				561594	

A21-012-15 REV.

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365796

000753

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No.: 35157

1. Matrix (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Field QC
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaHSO4
   4. H2SO4
   5. Ice only
   6. Other (Specify in Column D)
   N. Not preserved

2. Region No.: 6 | Sampling Co.: Roy F. Weston

Sampler (Name): Eric Tate

Sampler Signature: Eric Tate

3. Purpose*
   - Lead: SF, PRP, ST, FED
   - Early Action: CLEM, PA, REM, RI, SI, ESI
   - Long-Term Action: FS, RD, RA, O&M, NPLD

4. Date Shipped: — | Carrier: —

Airbill Number: —

5. Ship To: AATS
1900 West Hillcrest, Suite C
Broken Arrow, OK 74012
(918) 251-2153
ATTN: Harry Berg

6. Date Received -- Received by: 11/18/96

Laboratory Contract Number | Unit Price

7. Transfer to: | Date Received

Received by

Contract Number | Price

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/ PCB	High only: ARO/ TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
FFG02	S	L	G	5	X	X	X		6-015001-03	SED01	11/18/96 1055	MFG244	ECT			
FFG03	S	L	G	5	X	X	X		6-015005-07	SED02	11/18/96 1105	MFG245	ECT			
FFG04	S	L	G	5	X	X	X		6-015007-11	SED03	11/18/96 1120	MFG246	ECT			
FFG05	S	L	G	5	X	X	X		6-015013-15	SED04	11/18/96 1140	MFG247	ECT			
FFG07	S	L	G	5	X	X	X		6-015021-23	SED05	11/18/96 1135	MFG249	ECT			
FFG08	S	L	G	5	X	X	X		6-015025-27	SED07	11/18/96 1150	MFG250	ECT			
FFG14	S	L	G	5	X	X	X		6-015044-51	SED4	11/18/96 1210	MFG256	ECT			
FFG15	S	L	G	5	X	X	X		6-015053-55	SED5	11/18/96 1215	MFG257	ECT			
FFG16	S	L	G	5	X	X	X		6-015057-59	SED6	11/18/96 1215	MFG258	ECT			
FFG22	S	L	G	5	X	X	X		6-015081-83	SED12	11/18/96 1225	MFG264	ECT			

Shipment for Case Complete? (Y/N): Y

Page: 1 of 2

Sample(s) to be Used for Laboratory QC: FFG02

Additional Sampler Signatures

Chain of Custody Seal Number(s)

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Eric Tate	11/18/96				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
			11/18/96 1930	intact	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy FFG02; Yellow - Lab Copy for Return to CLASS

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A21-012-16 REV.

000754

EPA — United States Environmental Protection Agency, Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

Case No. 2615

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

2. Region No.: 6 | Sampling Co.: Roy F. Weston
Sampler (Name): Eric Tate
Sampler Signature: Eric Tate
3. Purpose*: Lead [ ] SF [ ] PRP [ ] ST [ ] FED; Early Action [ ] CLEM [ ] PA [ ] REM [ ] RI [ ] SI [X] ESI; Long-Term Action [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

4. Date Shipped: — | Carrier: —
Airbill Number: —

5. Ship To: AATS
1700 West Albany, Suite C
Broken Arrow, OK 74012
(918) 251-2855
ATTN: Harry Berg

6. Date Received -- Received by: M. McLeod 11/18/96
Laboratory Contract Number | Unit Price
7. Transfer to: | Date Received
Received by
Contract Number | Price

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only / ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
FF623	5	L	G	5	X	X	X		6-015085-87	SS13	11/13/96 1225	MF6265	EC1			

Shipment for Case Complete? (Y/N): Y
Page: 2 of 2
Sample(s) to be Used for Laboratory QC: FFC02
Additional Sampler Signatures
Chain of Custody Seal Number(s)

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? (Y/N/none)	
			11/13/96 1930	intact	

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A21-012-16 REV.

365796

000755

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 25159

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

2. Region No.: 6 | Sampling Co.: Roy F. Weston

4. Date Shipped: — | Carrier: —

6. Date Received -- Received by: 11/19/96

Sampler (Name): Eric Tate

Airbill Number: —

Laboratory Contract Number | Unit Price

Sampler Signature: Eric Tate

5. Ship To: AATS
1700 West Albany, Suite C
Broken Arrow, OK 74012
(918) 251-3355
ATTN: Harry Berg

7. Transfer to: | Date Received

Received by

Contract Number | Price

3. Purpose*
Lead: SF, PRP, ST, FED
Early Action: CLEM, PA, REM, RI, SI, ESI
Long-Term Action: FS, RD, RA, O&M, NPLD

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
FFG06	S	L	G	S	X	X	X		6-015017-19	SED07	11/19/96 1[illegible]	MFG[illegible]241	ECT			
FFG11	S	L	G	S	X	X	X		6-015037-39	SED1	11/19/96 121	MFG252	ECT			
FFG12	S	L	G	S	X	X	X		6-015041-43	SSØ2	11/19/96 121[illegible]	MFG254	ECT			
FFG13	S	L	G	S	X	X	X		6-015045-47	SSØ3	11/19/96 123	MFG255	ECT			
FFG17	S	L	G	S	X	X	X		6-015061-63	SSØ7	11/19/96 1405	MFG259	ECT			
FFG18	S	L	G	S	X	X	X		6-015065-67	SSØ8	11/19/96 1415	MFG260	ECT			
* FFG21	S	L	G	S	X	X	X		6-015077-79	SS11	11/19/96 13[illegible]	MFG263	ECT			
FFG09	S	L	G	S	X	X	X		6-015029-31	SED08	11/19/96 1[illegible]0	MFG251	ECT			
FFG10	S	L	G	S	X	X	X		6-015033-35	SED09	11/19/96 1145	MFG252	ECT			
FFG24	S	L	G	S	X	X	X		6-015089-91	SED1[illegible]	11/19/96 1535	MFG266	ECT			

Shipment for Case Complete? (Y/N)

Page (FG) 1 of 1

Sample(s) to be Used for Laboratory QC: FFG24

Additional Sampler Signatures

Chain of Custody Seal Number(s)

* SDG Final Sample

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Eric Tate	11/19/96 1300	[illegible]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? (Y)/N/none	
		[signature]	11/19/96 19:00	intact	1595195

A21-012-16 REV.

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36017

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615962123

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G08	FF-G09	FF-G09RE	FF-G10	FF-G11	FF-G12	FF-G13
Carbazole	46 J	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-butylphthalate	430 U	460 U	460 U *	400 U	410 U	23 J	380 U
Fluoranthene	240 J	460 U	460 U *	400 U	410 U	68 J	380 U
Pyrene	170 J	49 J	43 *	400 U	410 U	62 J	380 U
Butylbenzylphthalate	48 J	29 J	32 *	400 U	25 J	21 J	380 U
3,3'-Dichlorobenzidine	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Benzo(a)anthracene	430 U	460 U	460 U *	400 U	410 U	36 J	380 U
Chrysene	96 J	49 J	44 *	400 U	410 U	50 J	380 U
bis(2-Ethylhexyl)phthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-octylphthalate	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(b)fluoranthene	430 U	31 J	29 *	400 U	410 U	42 J	380 U
Benzo(k)fluoranthene	430 U	31 J	29 *	400 U	410 U	51 J	380 U
Benzo(a)pyrene	430 U	27 J	24 *	400 U	410 U	36 J	380 U
Indeno(1,2,3-cd)pyrene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Dibenz(a,h)anthracene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(g,h,i)perylene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	23	29	29	18	19	20	14
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	35	33	28	21	35	26	35

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SG15053

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G08	FF-G09	FF-G09RE	FF-G10	FF-G11	FF-G12	FF-G13
Phenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
bis(2-Chloroethyl)ether	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Chlorophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,3-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,4-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,2-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,2'-Oxybis(1-chloropropane)	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
N-Nitroso-di-n-propylamine	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachloroethane	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Nitrobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Isophorone	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Nitrophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,4-Dimethylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
bis(2-Chloroethoxy)methane	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,4-Dichlorophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,2,4-Trichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Naphthalene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Chloroaniline	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachlorobutadiene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Chloro-3-methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Methylnaphthalene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachlorocyclopentadiene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4,6-Trichlorophenol	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4,5-Trichlorophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
2-Chloronaphthalene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Dimethylphthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Acenaphthylene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,6-Dinitrotoluene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
3-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Acenaphthene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4-Dinitrophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
4-Nitrophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Dibenzofuran	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4-Dinitrotoluene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Diethylphthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Chlorophenyl-phenylether	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Fluorene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
4,6-Dinitro-2-methylphenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
N-Nitrosodiphenylamine	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Bromophenyl-phenylether	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Hexachlorobenzene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Pentachlorophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Phenanthrene	210 J	460 U	460 U *	400 U	410 U	34 J	380 U
Anthracene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615951

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G02		FF-G03		FF-G04		FF-G05		FF-G06		FF-G06RE		FF-G07	
Phenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
bis(2-Chloroethyl)ether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Chlorophenol	400	U	390	U	42	J	410	U	420	U *	420	UJv	440	U
1,3-Dichlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
1,4-Dichlorobenzene	400	U	390	U	29	J	410	U	420	U *	420	UJv	440	U
1,2-Dichlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Methylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,2'-Oxybis(1-chloropropane)	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Methylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
N-Nitroso-di-n-propylamine	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachloroethane	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Nitrobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Isophorone	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Nitrophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dimethylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
bis(2-Chloroethoxy)methane	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dichlorophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
1,2,4-Trichlorobenzene	400	U	390	U	27	J	410	U	420	U *	420	UJv	440	U
Naphthalene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chloroaniline	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachlorobutadiene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chloro-3-methylphenol	400	U	390	U	34	J	410	U	420	U *	420	UJv	440	U
2-Methylnaphthalene	400	U	390	U	420	U	60	J	420	U *	420	UJv	440	U
Hexachlorocyclopentadiene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4,6-Trichlorophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4,5-Trichlorophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
2-Chloronaphthalene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Dimethylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Acenaphthylene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,6-Dinitrotoluene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
3-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Acenaphthene	400	U	390	U	32	J	22	J	420	U *	420	UJv	440	U
2,4-Dinitrophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
4-Nitrophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Dibenzofuran	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dinitrotoluene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Diethylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chlorophenyl-phenylether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Fluorene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
4,6-Dinitro-2-methylphenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
N-Nitrosodiphenylamine	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Bromophenyl-phenylether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Pentachlorophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Phenanthrene	400	U	390	U	420	U	220	J	46	*	420	UJv	440	U
Anthracene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G02		FF-G03		FF-G04		FF-G05		FF-G06		FF-G06RE		FF-G07	
Carbazole	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Di-n-butylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Fluoranthene	400	U	390	U	420	U	130	J	420	U *	420	UJv	440	U
Pyrene	400	U	390	U	420	U	180	J	420	U *	420	UJv	440	U
Butylbenzylphthalate	35	J	36	J	34	J	57	J	420	U *	420	UJv	45	J
3,3'-Dichlorobenzidine	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Benzo(a)anthracene	400	U	390	U	420	U	100	J	420	U *	420	UJv	440	U
Chrysene	400	U	390	U	420	U	150	J	420	U *	420	UJv	440	U
bis(2-Ethylhexyl)phthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Di-n-octylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Benzo(b)fluoranthene	400	U	390	U	420	U	90	J	420	U *	420	UJv	440	U
Benzo(k)fluoranthene	400	U	390	U	420	U	84	J	420	U *	420	UJv	440	U
Benzo(a)pyrene	400	U	390	U	420	U	100	J	420	U *	420	UJv	440	U
Indeno(1,2,3-cd)pyrene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Dibenz(a,h)anthracene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Benzo(g,h,i)perylene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	18		16		21		19		22		22		25	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:	10		9		9		22		20		35		33	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615956.

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G18	FF-G18RE	FF-G21	FF-G21RE	FF-G22	FF-G22RE	FF-G23
Phenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethyl)ether	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Chlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,3-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,4-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,2'-Oxybis(1-chloropropane)	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
N-Nitroso-di-n-propylamine	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachloroethane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Nitrobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Isophorone	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Nitrophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dimethylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethoxy)methane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dichlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2,4-Trichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Naphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloroaniline	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorobutadiene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloro-3-methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylnaphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorocyclopentadiene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,6-Trichlorophenol	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,5-Trichlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
2-Chloronaphthalene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dimethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Acenaphthylene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,6-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
3-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Acenaphthene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4-Nitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dibenzofuran	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Diethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Chlorophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Fluorene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4,6-Dinitro-2-methylphenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
N-Nitrosodiphenylamine	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
4-Bromophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Hexachlorobenzene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Pentachlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
Phenanthrene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	35 J
Anthracene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G18	FF-G18RE	FF-G21	FF-G21RE	FF-G22	FF-G22RE	FF-G23
Carbazole	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Di-n-butylphthalate	400 U	400 U *	30 J	27 *	400 UJv	400 U *	400 U
Fluoranthene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Pyrene	38 J	400 U *	26 J	400 U *	400 UJv	400 U *	94 J
Butylbenzylphthalate	45 J	51 *	35 J	400 U *	400 UJv	400 U *	59 J
3,3'-Dichlorobenzidine	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	400 UJv
Benzo(a)anthracene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	400 UJv
Chrysene	26 J	26 *	22 J	400 U *	400 UJv	400 U *	82 J
bis(2-Ethylhexyl)phthalate	400 UJv	83 *	400 UJv	87 *	400 UJv	400 U *	400 UJv
Di-n-octylphthalate	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	400 UJv
Benzo(b)fluoranthene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	31 J
Benzo(k)fluoranthene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	26 J
Benzo(a)pyrene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	54 J
Indeno(1,2,3-cd)pyrene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	51 J
Dibenz(a,h)anthracene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	26 J
Benzo(g,h,i)perylene	400 UJv	400 U *	400 UJv	400 U *	400 UJv	400 U *	190 J
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	18	18	18	18	18	18
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	25	17	27	19	31	26	26

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

5615953

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

RESUBMITTED DATA REVIEW REPORT

DATE :	January 24, 1997	CASE #:	25159
		SAS # :	
TO :	L. Biasco (6SF-RA)	SDG # :	FFG02
		LAB :	AATS
FROM :	Maria Missler (LMSG)	SITE :	Wilcox Oil
	ESAT - Region 6	TDF # :	
		ESAT #:	O-1780

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

Laboratory response to Region 6 FAX request: (received 1/21/97)

A. BNA

1-2 The laboratory did not make any corrections based on the premise that the CLP contract does not state specifically that two TIC's cannot have the same CAS number and compound name. This response does not affect the original data assessment.

3. Sample FF-G16: The laboratory corrected and resubmitted Form I SV-2 and the quantitation report. Please replace pages 1297 and 1301 with the resubmitted ones and insert submitted pages 1301A-B.

4. Samples FF-G03, FF-G04, FF-G07, and FF-G10: The laboratory revised and resubmitted TIC data for these samples. Please replace pages 503, 508, 509, 522, 531, 532, 912, and 916-918 and insert pages 509A, 509B, 532A-C, 541A, 541B, 918A, and 935A.

5. The laboratory corrected and resubmitted the analysis log. Please replace page 2682 with the resubmitted one.

A revised data summary table for the BNA fraction is included with all changes in data qualification highlighted.

B. Pest/PCB

1. The laboratory corrected and resubmitted Forms VI PEST-2. Please replace pages 2327-2330 with the resubmitted ones.

2. Method blank PBLKSC: The laboratory response does not affect the original data assessment.

ORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

U	Not detected at reported quantitation limit.
N	Identification is tentative.
J	Estimated value.
R	Unusable.
^	High biased. Actual concentration may be lower than the concentration reported.
v	Low biased. Actual concentration may be higher than the concentration reported.
F+	A false positive exists.
F-	A false negative exists.
B	This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.
UJ	Estimated quantitation limit.
T	Identification is questionable because of absence of other commonly coexisting pesticides.
*	Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615960

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G23RE						
Phenol	400 U *						
bis(2-Chloroethyl)ether	400 U *						
2-Chlorophenol	400 U *						
1,3-Dichlorobenzene	400 U *						
1,4-Dichlorobenzene	400 U *						
1,2-Dichlorobenzene	400 U *						
2-Methylphenol	400 U *						
2,2'-Oxybis(1-chloropropane)	400 U *						
4-Methylphenol	400 U *						
N-Nitroso-di-n-propylamine	400 U *						
Hexachloroethane	400 U *						
Nitrobenzene	400 U *						
Isophorone	400 U *						
2-Nitrophenol	400 U *						
2,4-Dimethylphenol	400 U *						
bis(2-Chloroethoxy)methane	400 U *						
2,4-Dichlorophenol	400 U *						
1,2,4-Trichlorobenzene	400 U *						
Naphthalene	400 U *						
4-Chloroaniline	400 U *						
Hexachlorobutadiene	400 U *						
4-Chloro-3-methylphenol	400 U *						
2-Methylnaphthalene	400 U *						
Hexachlorocyclopentadiene	400 U *						
2,4,6-Trichlorophenol	400 U *						
2,4,5-Trichlorophenol	1000 U *						
2-Chloronaphthalene	400 U *						
2-Nitroaniline	1000 U *						
Dimethylphthalate	400 U *						
Acenaphthylene	400 U *						
2,6-Dinitrotoluene	400 U *						
3-Nitroaniline	1000 U *						
Acenaphthene	400 U *						
2,4-Dinitrophenol	1000 U *						
4-Nitrophenol	1000 U *						
Dibenzofuran	400 U *						
2,4-Dinitrotoluene	400 U *						
Diethylphthalate	400 U *						
4-Chlorophenyl-phenylether	400 U *						
Fluorene	400 U *						
4-Nitroaniline	1000 U *						
4,6-Dinitro-2-methylphenol	1000 U *						
N-Nitrosodiphenylamine	400 U *						
4-Bromophenyl-phenylether	400 U *						
Hexachlorobenzene	400 U *						
Pentachlorophenol	1000 U *						
Phenanthrene	35 *						
Anthracene	400 U *						

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G23RE								
Carbazole	400 U	*							
Di-n-butylphthalate	28	*							
Fluoranthene	23	*							
Pyrene	90	*							
Butylbenzylphthalate	81	*							
3,3'-Dichlorobenzidine	400 U	*							
Benzo(a)anthracene	400 U	*							
Chrysene	77	*							
bis(2-Ethylhexyl)phthalate	79	*							
Di-n-octylphthalate	400 U	*							
Benzo(b)fluoranthene	35	*							
Benzo(k)fluoranthene	41	*							
Benzo(a)pyrene	60	*							
Indeno(1,2,3-cd)pyrene	29	*							
Dibenz(a,h)anthracene	400 U	*							
Benzo(g,h,i)perylene	110	*							
Sample wt (g):	30								
%Moisture:	18								
Dilution Factor:	1								
Level:	LOW								
Number of TIC's:	35								

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG16

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10137.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
7005-72-3	4-Chlorophenyl-phenylether	430	U
86-73-7	Fluorene	430	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	430	U
120-12-7	Anthracene	430	U
86-74-8	Carbazole	430	U
84-74-2	Di-n-butylphthalate	150	JB
206-44-0	Fluoranthene	430	U
129-00-0	Pyrene	430	U
85-68-7	Butylbenzylphthalate	100	J
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	90	J
218-01-9	Chrysene	430	U
117-81-7	bis(2-Ethylhexyl)phthalate	430	U
117-84-0	Di-n-octylphthalate	27	J
205-99-2	Benzo(b)fluoranthene	430	U
207-08-9	Benzo(k)fluoranthene	430	U
50-32-8	Benzo(a)pyrene	150	J
193-39-5	Indeno(1,2,3-cd)pyrene	430	U
53-70-3	Dibenz(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	430	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG16

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10137.D

Level: (low/med) LOW Date Received: 11/18/96, 11/21/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.203	250	J
2.		UNKNOWN	3.282	1800	J
3.		UNKNOWN	3.656	460	JB
4.		UNKNOWN	3.853	360	J
5.		UNKNOWN	3.991	390	JB
6.		UNKNOWN	4.059	230	JB
7.	123-42-2	2-Pentanone, 4-hydroxy-4-met	4.158	2200	NJA
8.		UNKNOWN AMIDE	4.237	460	J
9.		UNKNOWN	4.926	160	J
10.		-Hexen--one, -methyl-	5.359	150	J
11.		UNKNOWN	7.427	150	J
12.		Phenol, -ethyl-	7.948	120	J
13.		UNKNOWN	15.526	440	J
14.		UNKNOWN	15.873	240	J
15.		UNKNOWN	17.101	280	J
16.		UNKNOWN	17.567	230	J
17.		UNKNOWN	17.875	220	J
18.		UNKNOWN	18.510	280	J
19.		UNKNOWN	19.503	260	J
20.		UNKNOWN	19.970	260	J
21.		UNKNOWN	20.358	650	J
22.		Unknown	20.437	380	J
23.		UNKNOWN	20.567	490	J
24.		UNKNOWN	20.785	220	J
25.		UNKNOWN	20.845	250	J
26.		UNKNOWN	20.895	230	J
27.		UNKNOWN	21.114	310	J
28.		UNKNOWN	21.233	420	J
29.		UNKNOWN	21.322	680	J
30.		UNKNOWN	21.531	290	J

V

5615963

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG14

5615964

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10135.D

Level: (low/med) LOW Date Received: 11/18/96 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG14

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10135.D

Level: (low/med) LOW Date Received: 11/18/96 of 12/4/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

5615965

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG14

5615966

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10135.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Number TICs found: 22

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN AMIDE	3.281	130	J
2.		UNKNOWN	3.656	920	JB
3.		UNKNOWN	3.862	83	J
4.		-Buten--one, -methyl-	3.990	620	J
5.	123-42-2	2-Pentanone, 4-hydroxy-4-met	4.158	2300	NJA
6.		UNKNOWN	4.237	140	J
7.		UNKNOWN	4.926	280	J
8.		UNKNOWN	5.359	150	J
9.		-Hexen--one, -methyl-	5.487	140	J
10.		UNKNOWN	17.692	120	J
11.		UNKNOWN	20.106	230	J
12.		UNKNOWN	21.742	640	J
13.		UNKNOWN	21.860	290	J
14.		UNKNOWN	22.245	180	J
15.		UNKNOWN PAH	22.570	840	J
16.		UNKNOWN	22.679	600	J
17.		UNKNOWN PAH	22.698	500	J
18.		UNKNOWN	22.846	280	J
19.		UNKNOWN	22.915	170	J
20.		UNKNOWN	23.142	190	J
21.		UNKNOWN	24.226	1100	J
22.		UNKNOWN	24.394	600	J
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG15

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10136.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

5615967

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	380	U
111-44-4	bis(2-Chloroethyl)Ether	380	U
95-57-8	2-Chlorophenol	380	U
541-73-1	1,3-Dichlorobenzene	380	U
106-46-7	1,4-Dichlorobenzene	380	U
95-50-1	1,2-Dichlorobenzene	380	U
95-48-7	2-Methylphenol	380	U
108-60-1	2,2'-oxybis(1-Chloropropane)	380	U
106-44-5	4-Methylphenol	380	U
621-64-7	N-Nitroso-di-n-propylamine	380	U
67-72-1	Hexachloroethane	380	U
98-95-3	Nitrobenzene	380	U
78-59-1	Isophorone	380	U
88-75-5	2-Nitrophenol	380	U
105-67-9	2,4-Dimethylphenol	380	U
111-91-1	bis(2-Chloroethoxy)methane	380	U
120-83-2	2,4-Dichlorophenol	380	U
120-82-1	1,2,4-Trichlorobenzene	380	U
91-20-3	Naphthalene	81	J
106-47-8	4-Chloroaniline	380	U
87-68-3	Hexachlorobutadiene	380	U
59-50-7	4-Chloro-3-Methylphenol	380	U
91-57-6	2-Methylnaphthalene	200	J
77-47-4	Hexachlorocyclopentadiene	380	U
88-06-2	2,4,6-Trichlorophenol	380	U
95-95-4	2,4,5-Trichlorophenol	950	U
91-58-7	2-Chloronaphthalene	380	U
88-74-4	2-Nitroaniline	950	U
131-11-3	Dimethylphthalate	380	U
208-96-8	Acenaphthylene	380	U
606-20-2	2,6-Dinitrotoluene	380	U
99-09-2	3-Nitroaniline	950	U
83-32-9	Acenaphthene	380	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG15

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10136.D

Level: (low/med) LOW Date Received: 11/19/96 ph 12/24/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	950	U
100-02-7	4-Nitrophenol	950	U
132-64-9	Dibenzofuran	380	U
121-14-2	2,4-Dinitrotoluene	380	U
84-66-2	Diethylphthalate	380	U
7005-72-3	4-Chlorophenyl-phenylether	380	U
86-73-7	Fluorene	380	U
100-01-6	4-Nitroaniline	950	U
534-52-1	4,6-Dinitro-2-methylphenol	950	U
86-30-6	N-Nitrosodiphenylamine (1)	380	U
101-55-3	4-Bromophenyl-phenylether	380	U
118-74-1	Hexachlorobenzene	380	U
87-86-5	Pentachlorophenol	950	U
85-01-8	Phenanthrene	✓790	
120-12-7	Anthracene	380	U
86-74-8	Carbazole	380	U
84-74-2	Di-n-butylphthalate	380	U
206-44-0	Fluoranthene	380	U
129-00-0	Pyrene	560	
85-68-7	Butylbenzylphthalate	380	U
91-94-1	3,3'-Dichlorobenzidine	380	U
56-55-3	Benzo(a)anthracene	300	J
218-01-9	Chrysene	✓690	
117-81-7	bis(2-Ethylhexyl)phthalate	380	U
117-84-0	Di-n-octylphthalate	380	U
205-99-2	Benzo(b)fluoranthene	230	J
207-08-9	Benzo(k)fluoranthene	380	U
50-32-8	Benzo(a)pyrene	250	J
193-39-5	Indeno(1,2,3-cd)pyrene	380	U
53-70-3	Dibenz(a,h)anthracene	380	U
191-24-2	Benzo(g,h,i)perylene	440	

(1) - Cannot be separated from Diphenylamine

5615963

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

FFG15

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10136.D

Level: (low/med) LOW Date Received: 11/18/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN AMIDE	3.282	820	J
2.		UNKNOWN	3.665	1500	JB
3.		-Pentene, -dimethyl-	3.715	100	J
4.		UNKNOWN AMIDE	3.862	280	J
5.		-Buten--one, -methyl-	3.990	990	J
6.		UNKNOWN	4.059	200	JB
7.	123-42-2	2-Pentanone, 4-hydroxy-4-met	4.158	1900	NJ
8.		UNKNOWN	4.237	380	J
9.		Unknown	4.325	84	J
10.		UNKNOWN	4.926	420	J
11.	110-13-4	2,5-Hexanedione	5.113	130	NJ
12.		(5H)-Furanone, -dimethyl-	5.359	120	J
13.	90-12-0	Naphthalene, 1-methyl-	9.720	79	NJ
14.		Naphthalene, -dimethyl-	10.635	150	J
15.		UNKNOWN	11.157	140	J
16.		UNKNOWN	14.591	160	J
17.		UNKNOWN	14.729	160	J
18.		Anthracene, -methyl-	14.887	370	J
19.		Anthracene, -methyl-	14.936	540	J
20.		UNKNOWN	15.094	220	J
21.		1H-Indene, -phenyl-	15.123	170	J
22.		UNKNOWN	15.744	210	J
23.		Phenanthrene, -dimethyl-	15.882	170	J
24.		UNKNOWN PAH	16.128	240	J
25.		Pyrene, -methyl-	17.300	470	J
26.		Chrysene, -methyl-	19.312	570	J
27.		Triphenylene, -methyl-	19.381	440	J
28.		UNKNOWN	20.358	660	J
29.	198-55-0	Perylene	20.793	870	NJ
30.		UNKNOWN	21.741	340	J

5615969

1F

EPA SAMPLE NO.

FFG15

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10136.D

Level: (low/med) LOW Date Received: 11/~~19~~/96 DT 12/4/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	22.858	760	J
2.		UNKNOWN	23.174	320	J
3.		Unknown	23.470	370	J
4.		UNKNOWN	23.549	680	J
5.		UNKNOWN	23.648	530	J
6.					
7.					
8.					
9.					
10.					
11.					
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30.					

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3615970

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG15RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10195.D

Level: (low/med) LOW Date Received: 11/19/96 pf 12/4/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	380	U
111-44-4	bis(2-Chloroethyl)Ether	380	U
95-57-8	2-Chlorophenol	380	U
541-73-1	1,3-Dichlorobenzene	380	U
106-46-7	1,4-Dichlorobenzene	380	U
95-50-1	1,2-Dichlorobenzene	380	U
95-48-7	2-Methylphenol	380	U
108-60-1	2,2'-oxybis(1-Chloropropane)	380	U
106-44-5	4-Methylphenol	380	U
621-64-7	N-Nitroso-di-n-propylamine	380	U
67-72-1	Hexachloroethane	380	U
98-95-3	Nitrobenzene	380	U
78-59-1	Isophorone	380	U
88-75-5	2-Nitrophenol	380	U
105-67-9	2,4-Dimethylphenol	380	U
111-91-1	bis(2-Chloroethoxy)methane	380	U
120-83-2	2,4-Dichlorophenol	380	U
120-82-1	1,2,4-Trichlorobenzene	380	U
91-20-3	Naphthalene	380	U
106-47-8	4-Chloroaniline	380	U
87-68-3	Hexachlorobutadiene	380	U
59-50-7	4-Chloro-3-Methylphenol	380	U
91-57-6	2-Methylnaphthalene	180	J
77-47-4	Hexachlorocyclopentadiene	380	U
88-06-2	2,4,6-Trichlorophenol	380	U
95-95-4	2,4,5-Trichlorophenol	950	U
91-58-7	2-Chloronaphthalene	380	U
88-74-4	2-Nitroaniline	950	U
131-11-3	Dimethylphthalate	380	U
208-96-8	Acenaphthylene	380	U
606-20-2	2,6-Dinitrotoluene	380	U
99-09-2	3-Nitroaniline	950	U
83-32-9	Acenaphthene	380	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG15RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10195.D

Level: (low/med) LOW Date Received: 11/18/96 DK 12/24/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

5615972

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	950	U
100-02-7	4-Nitrophenol	950	U
132-64-9	Dibenzofuran	380	U
121-14-2	2,4-Dinitrotoluene	380	U
84-66-2	Diethylphthalate	380	U
7005-72-3	4-Chlorophenyl-phenylether	380	U
86-73-7	Fluorene	380	U
100-01-6	4-Nitroaniline	950	U
534-52-1	4,6-Dinitro-2-methylphenol	950	U
86-30-6	N-Nitrosodiphenylamine (1)	380	U
101-55-3	4-Bromophenyl-phenylether	380	U
118-74-1	Hexachlorobenzene	380	U
87-86-5	Pentachlorophenol	950	U
85-01-8	Phenanthrene	820	
120-12-7	Anthracene	380	U
86-74-8	Carbazole	380	U
84-74-2	Di-n-butylphthalate	57	JB
206-44-0	Fluoranthene	110	J
129-00-0	Pyrene	590	
85-68-7	Butylbenzylphthalate	380	U
91-94-1	3,3'-Dichlorobenzidine	380	U
56-55-3	Benzo(a)anthracene	280	J
218-01-9	Chrysene	670	
117-81-7	bis(2-Ethylhexyl)phthalate	380	U
117-84-0	Di-n-octylphthalate	380	U
205-99-2	Benzo(b)fluoranthene	210	J
207-08-9	Benzo(k)fluoranthene	58	J
50-32-8	Benzo(a)pyrene	240	J
193-39-5	Indeno(1,2,3-cd)pyrene	380	U
53-70-3	Dibenz(a,h)anthracene	380	U
191-24-2	Benzo(g,h,i)perylene	380	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG15RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10195.D

Level: (low/med) LOW Date Received: 11/18/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.104	960	J
2.		UNKNOWN	3.154	84	J
3.		UNKNOWN	3.488	1200	JB
4.		UNKNOWN	3.665	200	JB
5.		UNKNOWN	3.813	930	J
6.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.981	1800	NJB
7.		UNKNOWN	4.059	300	JB
8.		UNKNOWN HYDROCARBON	4.168	95	J
9.		UNKNOWN	4.247	180	J
10.		UNKNOWN	4.709	440	J
11.		UNKNOWN	4.749	620	J
12.	110-13-4	2,5-Hexanedione	4.896	140	NJ
13.		UNKNOWN	5.142	82	JB
14.		UNKNOWN	6.393	120	J
15.		UNKNOWN	7.672	92	J
16.	90-12-0	Naphthalene, 1-methyl-	9.453	100	NJ
17.		Naphthalene, -dimethyl-	10.379	170	J
18.		Naphthalene, -dimethyl-	10.526	85	J
19.		UNKNOWN	10.723	110	J
20.		UNKNOWN	13.528	170	J
21.		UNKNOWN PAH	14.306	150	J
22.		UNKNOWN PAH	14.454	130	J
23.		Anthracene, -methyl-	14.611	420	J
24.		Anthracene, -methyl-	14.661	630	J
25.		Anthracene, -methyl-	14.720	180	J
26.		Phenanthrene, -methyl-	14.809	130	J
27.		Phenanthrene, -dimethyl-	15.400	120	J
28.		Phenanthrene, -dimethyl-	15.459	140	J
29.		Phenanthrene, -dimethyl-	15.597	160	J
30.		Pyrene, -methyl-	17.017	410	J

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EPA SAMPLE NO.

FFG15RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10195.D

Level: (low/med) LOW Date Received: 11/19/96 12/4/96

% Moisture: 13 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Chrysene, -methyl-	19.029	490	J
2.		Chrysene, -methyl-	19.108	540	J
3.		UNKNOWN	20.104	820	J
4.		UNKNOWN	20.499	500	J
5.		UNKNOWN	23.184	590	J
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG16

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10137.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)Ether	430	U
95-57-8	2-Chlorophenol	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
95-50-1	1,2-Dichlorobenzene	430	U
95-48-7	2-Methylphenol	61	J
108-60-1	2,2'-oxybis(1-Chloropropane)	430	U
106-44-5	4-Methylphenol	94	J
621-64-7	N-Nitroso-di-n-propylamine	430	U
67-72-1	Hexachloroethane	430	U
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	360	J
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
120-82-1	1,2,4-Trichlorobenzene	430	U
91-20-3	Naphthalene	430	U
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	430	U
59-50-7	4-Chloro-3-Methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	430	U
208-96-8	Acenaphthylene	430	U
606-20-2	2,6-Dinitrotoluene	430	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	430	U

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

5615976

MEMORANDUM

Date: 1-21-1997

Subject: **Contract Laboratory Program Data Review**

From: Melvin L. Ritter, ESAT RPO, 6MD-HC

To: L. Biasco , 6SF-RA

Site: WILCOX OIL

Case#: 25159

SDG#: FF-G02

The EPA Region 6 Houston Branch ESAT data validation team has completed a review of the submitted Contract Laboratory Program (CLP) data package for the referenced site. The samples analyzed and reviewed are detailed in the attached Regional data review and assessment report for this case.

The data package was found to be:

( ) Acceptable: No major problems with data package.

(X) Provisional: Use of data requires caution.
Data is acceptable for Regional use. Problems are noted in the review report.

( ) Unacceptable: Some or all of data should not be used.
Problems are noted in the review report.

Questions regarding the data review report can be addressed to me.

Attachments

cc: R. Flores, Region 6 CLP/TPO
M. El-feky, Region 6 Data Coordinator

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LOCKHEED MARTIN SERVICES GROUP
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HOUSTON, TX 77074

5615977

MEMORANDUM

DATE: January 10, 1997
TO: Dr. Melvin Ritter, ESAT RPO, Region VI
FROM: Dr. Tom C. H. Chiang, ESAT ETM, Region VI
SUBJECT: CLP Data Review
REF: TDF # 6-7113A
ESAT # O-1780

Attached is the data review summary for Case # 25159
SDG # FFG02
Site Wilcox Oil

COMMENTS:

I. CONTRACTUAL ASSESSMENT OF THE DATA PACKAGE

A. The data package contained the following contractual non-compliance as determined by the hard copy data review and the CCS audit.

The laboratory extracted BNA sample FF-G06RE 29 days after sample receipt (OLM03.0, D-18/SVOA, 8.4.1). All results were qualified for this sample because of the excessive holding time.

B. The data package contained the following contractual non-compliance as determined by the hard copy data review but not by CCS.

1. Pest/PCB method blank PBLKSC had a peak on the DB-17 column above the CRQL that interfered with the detection of endosulfan sulfate (OLM03.0, D-73/PEST, 12.1.2.4). This deficiency caused the raised quantitation limits for endosulfan sulfate in samples FF-G15 and FF-G23.

2. The data package arrived three days late.

II. TECHNICAL/USABILITY ASSESSMENT OF THE DATA PACKAGE

A total of 2,500 results were reviewed for this data package. The data package is technically provisional and technical deficiencies are listed below.

1. One BNA sample was extracted 29 days after sample collection.

2. Four VOA and eight BNA samples had low internal standard responses.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

ORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 25159
LABORATORY AATS
CONTRACT# 68-D5-0022
SDG# FFG02
SOW# RAS SOW OLM03.2
ACCT# 7FAXJN28 SF# FAXUZZ

SITE Wilcox Oil
NO. OF SAMPLES 20
MATRIX Soil
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Maria Missler
COMPLETION DATE January 10, 1997

SAMPLE NO.				
FF-G02	FF-G06	FF-G10	FF-G14	FF-G18
FF-G03	FF-G07	FF-G11	FF-G15	FF-G21
FF-G04	FF-G08	FF-G12	FF-G16	FF-G22
FF-G05	FF-G09	FF-G13	FF-G17	FF-G23

DATA ASSESSMENT SUMMARY

	VOA	BNA	PEST
1. HOLDING TIMES	O	M	O
2. GC/MS TUNE/INSTR. PERFORM.	O	O	O
3. CALIBRATIONS	M	O	O
4. BLANKS	O	O	M
5. SMC/SURROGATES	O	O	O
6. MATRIX SPIKE/DUPLICATE	O	O	O
7. OTHER QC	M	O	O
8. INTERNAL STANDARDS	M	M	N/A
9. COMPOUND ID/QUANTITATION	O	O	M
10. PERFORMANCE/COMPLETENESS	O	O	O
11. OVERALL ASSESSMENT	M	M	M

O = Data had no problems.
M = Data qualified because of major or minor problems.
Z = Data unacceptable.
NA = Not applicable.

ACTION ITEMS: BNA sample FF-G06RE was extracted 19 days past the holding time requirement. One Pest/PCB method blank had a peak that interfered with the detection of endosulfan sulfate above the CRQL on one column.

AREA OF CONCERN: The extraction holding time was excessive for BNA sample FF-G06RE. A contaminant in the method blank obscured the detection of endosulfan sulfate in two Pest/PCB samples. Acetone failed technical calibration criteria. Four VOA and eight BNA samples had low internal standard responses. Results were inconsistent for a pair of field duplicates. The two column quantitation results differed by more than 25 percent for three Pest/PCB samples. The data package arrived three days late.

000783

COMMENTS/CLARIFICATIONS
REGION 6 CLP QA REVIEW

CASE 25159 **SDG** FFG02 **SITE** Wilcox Oil **LAB** AATS

The following is a summary of sample qualifiers used by Region 6 in reporting this CLP data:

No.	Acceptable	Provisional	Unacceptable
VOA	14	6	
BNA	11	9	
PEST	16	4	

COMMENTS: The case consisted of 20 soil samples for complete RAS organic analysis. The OTR/COC Record designated sample FF-G02 for MS/MSD analyses and samples FF-G07/FF-G08, FF-G17/FF-G18, and FF-G22/FF-G23 as field duplicate pairs. The laboratory analyzed at low levels the VOA/BNA soil samples.

The data package contained the following contractual non-compliances.

BNA sample FF-G06RE was extracted 19 days past the contractual holding time limit. Only sample FF-G06RE is billable even though the laboratory also submitted data for the original analysis FF-G06.

The Pest/PCB method blank PBLKSC had a peak interfering with the detection of endosulfan sulfate above the CRQL on one column.

The data package arrived 3 days late for the contractual 35-day turnaround time.

VOA Samples FF-G11, FF-G13, FF-G15, and FF-G22 and their reanalyses had low internal standard responses. The reanalyses should be used for all except sample FF-G15.

BNA The extraction holding time for sample FF-G06RE was excessive (29 days past collection). Samples FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 and their reanalyses had low internal standard responses. To minimize data qualification, the reviewer recommends using some results from the original analysis and some from the reanalysis depending on the associated internal standard performance.

Pest/PCB An interfering contaminant in the method blank obscured the detection of endosulfan sulfate in samples FF-G15 and FF-G23.

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CASE 25159 **SDG** FFG02 **SITE** Wilcox Oil **LAB** AATS

Comments (continued)

Acetone, methylene chloride, phenanthrene, pyrene, chrysene, benzo(ghi)perylene, chlordanes, endrin, heptachlor epoxide, endosulfan sulfate, endrin ketone, endrin aldehyde, and endosulfan II were reported in a few samples above the CRQL's. Some results are provisional for six VOA, nine BNA, and four Pest/PCB samples because of problems with holding time, calibration, blank contamination, field duplicate consistency, internal standard responses, and compound quantitation.

The technical usability of all reported sample results is appropriately indicated by ESAT's final data qualifiers in the attached Data Summary Tables. An Evidence Audit was conducted for the Complete Sample Delivery Group File (CSF), and the Evidence Inventory Checklist is attached to this report.

NOTE: THE FOLLOWING REVIEW NARRATIVE ADDRESSES BOTH CONTRACTUAL AND TECHNICAL ISSUES. THE ASSESSMENT MADE FOR EACH QC PARAMETER IS SOLELY BASED ON THE TECHNICAL DATA USABILITY, WHICH MAY NOT NECESSARILY BE AFFECTED BY CONTRACTUAL PROBLEMS.

1. **Holding Times:** Provisional. All samples met the contractual holding time requirement except as follows. No technical holding time criteria exist for soil samples.

BNA sample FF-G06RE was extracted 29 days after collection and receipt. In the reviewer's opinion, all results are estimated and biased low because of the excessive holding time.

2. **Tuning/Performance:** Acceptable. The BFB and DFTPP analyses met GC/MS tuning criteria. The VOA and BNA sample analyses were within 12 hours of the respective BFB/DFTPP analyses. The Pest/PCB analyses met performance guidelines.

3. **Calibrations:** Provisional. Target compounds met contractual calibration criteria. The acetone result is estimated in VOA sample FF-G17 because of a technical %D calibration deficiency.

Pest/PCB The reviewer was unable to reproduce the following calibration results on both analytical columns based on the raw data submitted:

the TCX and DCB initial calibration factors; and

the TCX and DCB calculated amounts in all INDAM/INDBM calibration verification analyses.

CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

3. **Calibrations, Pest/PCB** (continued)

The results reported by the laboratory differed consistently by a factor of two from the reviewer-calculated ones. The reviewer did not qualify results because the reported %RSD and %D values were not affected. However, the laboratory was contacted for clarification of this discrepancy.

4. **Blanks:** Provisional. The VOA and BNA method and storage blanks met contractual requirements.

BNA The method blanks contained phthalates below the CRQL's. In the reviewer's opinion, all "B"-flagged laboratory results should be considered as undetected (U) because the sample concentrations were less than 10X the associated blank concentrations.

Pest/PCB Soil method blank PBLKSC contained a peak above the CRQL that interfered with the identification of endosulfan sulfate on one column. The reviewer qualified as undetected the endosulfan sulfate results in associated samples FF-G15 and FF-G23 because of possible laboratory contamination.

In the reviewer's opinion, the following results should be used as raised quantitation limits because of the presence of the analyte in the associated method blanks (below the CRQL's) on one or both columns:

endrin aldehyde in sample FF-G12; and

γ-chlordane in sample FF-G17.

The γ-chlordane result in sample FF-G18 is biased high and "B" flagged because of possible laboratory contamination.

5. **System Monitoring Compounds (SMC)/Surrogates:** Acceptable. The SMC and surrogate recoveries met QC criteria except as follows.

BNA Sample FF-G06 had high recoveries for two base-neutral surrogates. The re-extraction had acceptable recoveries and should be used.

Samples FF-G17RE, FF-G18RE, FF-G21RE, and FF-G22RE had high recoveries for two base-neutral surrogates. No results were qualified for the high recoveries as no analytes were detected above the CRQL's in these samples.

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CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

5. **System Monitoring Compounds (SMC)/Surrogates** (continued)

Pest/PCB All reported surrogate recoveries were a factor of two lower than the reviewer-calculated ones. This problem is a consequence of the incorrect calibration factors reported for the initial calibrations (see section 3). All surrogate recoveries were within QC limits based on the reviewer's calculations.

6. **Matrix Spike/Matrix Spike Duplicate:** Acceptable. The MS/MSD analyses met recovery and precision requirements for all fractions.

7. **Other QC:**

Field Duplicates: Provisional. The acetone and methylene chloride results are estimated in field duplicates FF-G17 and FF-G18 because of inconsistent concentrations (differ by a factor of two or more). Other field duplicate results were consistent.

8. **Internal Standards:** Provisional. The internal standard (IS) responses and retention times were within the QC limits with the following exceptions.

VOA Samples FF-G11, FF-G13, FF-G15, and FF-G22 were reanalyzed because of low IS responses. The reanalyses had low but improved responses for samples FF-G11, FF-G13, and FF-G22, so the reanalysis data should be used. The original analysis data should be used for sample FF-G15.

Results are estimated and quantitation limits biased low for analytes associated with the following IS's because of the low IS responses:

Sample	IS
FF-G11RE	IS3
FF-G13RE	IS1, IS3
FF-G15	IS2, IS3
FF-G22RE	IS3

BNA Sample FF-G06 had low internal standard responses, but the reanalysis had acceptable responses, and data should be used. Sample FF-G02MSD had one low IS response, but reanalysis was not required.

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CASE 25159 SDG FFG02 SITE Wilcox Oil LAB AATS

Internal Standards, BNA (continued)

Samples FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 and their reanalyses had outlying IS responses. To minimize data qualification, the reviewer recommends using some results from the original analysis and some from the reanalysis depending on the associated IS performance. The results designated for use are indicated on the attached data summary tables.

The reviewer qualified results as estimated and quantitation limits biased low for analytes associated with the following IS's because of the low IS responses:

Sample	IS
FF-G09	IS6
FF-G15	IS4, IS5, IS6
FF-G16	IS4, IS5, IS6
FF-G17	IS5, IS6
FF-G18	IS5, IS6
FF-G21	IS5, IS6
FF-G22	IS4, IS5, IS6
FF-G23	IS5, IS6

9. **Compound Identity/Quantitation:** Provisional. Acetone, methylene chloride, phenanthrene, pyrene, chrysene, benzo(ghi)-perylene, chlordanes, endrin, heptachlor epoxide, endosulfan sulfate, endrin ketone, endrin aldehyde, and endosulfan II were reported in a few samples above the CRQL's. Compound identification and quantitation met contractual guidelines for the VOA and BNA samples. GC/MS confirmation was not feasible for the Pest/PCB positive results.

Pest/PCB The "P" flagged results above CRQL's are estimated in samples FF-G15, FF-G17, FF-G18, and FF-G23 because the quantitation results between the two columns differ by more than 25 percent.

10. **Performance/Completeness:** Acceptable. The laboratory response to the CCS request was received and should be used. The data package was complete with minor deficiencies. The laboratory was contacted for correction and resubmission (see attached FAX Record Log).

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ORGANIC QA REVIEW
CONTINUATION PAGE

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CASE 25159 **SDG** FFG02 **SITE** Wilcox Oil **LAB** AATS

11. Overall Assessment: Data are acceptable for 14 VOA, 11 BNA, and 16 Pest/PCB samples.

VOA Some results are estimated for samples FF-G11RE, FF-G13RE, FF-G15, FF-G17, FF-G18, and FF-G22RE because of a calibration deficiency, inconsistent field duplicate results, and low internal standard responses.

BNA Some results are estimated for samples FF-G06RE, FF-G09, FF-G15, FF-G16, FF-G17, FF-G18, FF-G21, FF-G22, and FF-G23 because of a holding time problem and low internal standard responses.

Pest/PCB Some results are estimated for samples FF-G15, FF-G17, FF-G18, and FF-G23 because of blank contamination and compound quantitation deficiencies.

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221282

ORGANIC DATA QUALIFIER DEFINITIONS

The following definitions provide brief explanations of the ESAT-Region 6 qualifiers assigned to results in the Data Summary Table.

U	Not detected at reported quantitation limit.
N	Identification is tentative.
J	Estimated value.
R	Unusable.
^	High biased. Actual concentration may be lower than the concentration reported.
v	Low biased. Actual concentration may be higher than the concentration reported.
F+	A false positive exists.
F-	A false negative exists.
B	This result may be high biased because of laboratory/field contamination. The reported concentration is above 5X or 10X the concentration reported in the method/field blank.
UJ	Estimated quantitation limit.
T	Identification is questionable because of absence of other commonly coexisting pesticides.
*	Result not recommended for use because of associated QA/QC performance inferior to that from other analysis.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G02		FF-G03		FF-G04		FF-G05		FF-G06		FF-G07		FF-G08	
Chloromethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Bromomethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Vinyl chloride	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Chloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Methylene chloride	1	J	1	J	2	J	2	J	13	U	13	U	2	J
Acetone	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Carbon disulfide	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,1-Dichloroethene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,1-Dichloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,2-Dichloroethene (total)	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Chloroform	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,2-Dichloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
2-Butanone	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,1,1-Trichloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Carbon tetrachloride	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Bromodichloromethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,2-Dichloropropane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
cis-1,3-Dichloropropene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Trichloroethene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Dibromochloromethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,1,2-Trichloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Benzene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
trans-1,3-Dichloropropene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Bromoform	12	U	12	U	13	U	12	U	13	U	13	U	13	U
4-Methyl-2-pentanone	12	U	12	U	13	U	12	U	13	U	13	U	13	U
2-Hexanone	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Tetrachloroethene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
1,1,2,2-Tetrachloroethane	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Toluene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Chlorobenzene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Ethylbenzene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Styrene	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Xylenes (total)	12	U	12	U	13	U	12	U	13	U	13	U	13	U
Sample wt (g):	5		5		5		5		5		5		5	
%Moisture:	18		16		21		19		22		25		23	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:	1		1		1		1		1		0		0	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

5615985

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G09	FF-G10	FF-G11	FF-G11RE	FF-G12	FF-G13	FF-G13RE
Chloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Bromomethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Vinyl chloride	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Chloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Methylene chloride	5 J	12 U	5 *	12 U	12 U	12 U *	28 J
Acetone	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Carbon disulfide	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1-Dichloroethene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1-Dichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,2-Dichloroethene (total)	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
Chloroform	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,2-Dichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
2-Butanone	14 U	12 U	12 U *	12 U	12 U	12 U *	12 UJv
1,1,1-Trichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Carbon tetrachloride	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Bromodichloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
1,2-Dichloropropane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
cis-1,3-Dichloropropene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Trichloroethene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Dibromochloromethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
1,1,2-Trichloroethane	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Benzene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
trans-1,3-Dichloropropene	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
Bromoform	14 U	12 U	12 U *	12 U	12 U	12 U *	12 U
4-Methyl-2-pentanone	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
2-Hexanone	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Tetrachloroethene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
1,1,2,2-Tetrachloroethane	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Toluene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Chlorobenzene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Ethylbenzene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Styrene	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Xylenes (total)	14 U	12 U	12 U *	12 UJv	12 U	12 U *	12 UJv
Sample wt (g):	5	5	5	5	5	5	5
%Moisture:	29	18	19	19	20	14	14
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	0	0	0	0	0	0	1

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

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VOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G14	FF-G15	FF-G15RE	FF-G16	FF-G17	FF-G18	FF-G21
Chloromethane	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
Bromomethane	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
Vinyl chloride	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
Chloroethane	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
Methylene chloride	12 U	2 J	11 U *	13 U	23 J	12 UJ	12 U
Acetone	12 U	11 U	11 U *	13 U	48 J	12 UJ	12 U
Carbon disulfide	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
1,1-Dichloroethene	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
1,1-Dichloroethane	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
1,2-Dichloroethene (total)	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
Chloroform	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
1,2-Dichloroethane	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
2-Butanone	12 U	11 U	11 U *	13 U	12 U	12 U	12 U
1,1,1-Trichloroethane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Carbon tetrachloride	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Bromodichloromethane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
1,2-Dichloropropane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
cis-1,3-Dichloropropene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Trichloroethene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Dibromochloromethane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
1,1,2-Trichloroethane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Benzene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
trans-1,3-Dichloropropene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Bromoform	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
4-Methyl-2-pentanone	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
2-Hexanone	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Tetrachloroethene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
1,1,2,2-Tetrachloroethane	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Toluene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Chlorobenzene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Ethylbenzene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Styrene	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Xylenes (total)	12 U	11 UJv	11 U *	13 U	12 U	12 U	12 U
Sample wt (g):	5	5	5	5	5	5	5
%Moisture:	18	13	13	24	18	18	18
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	0	0	0	0	0	0	0

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

VOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G22		FF-G22RE		FF-G23									
Chloromethane	12 U	*	12 U		12 U									
Bromomethane	12 U	*	12 U		12 U									
Vinyl chloride	12 U	*	12 U		12 U									
Chloroethane	12 U	*	12 U		12 U									
Methylene chloride	5	*	12 U		12 U									
Acetone	12 U	*	12 U		12 U									
Carbon disulfide	12 U	*	12 U		12 U									
1,1-Dichloroethene	12 U	*	12 U		12 U									
1,1-Dichloroethane	12 U	*	12 U		12 U									
1,2-Dichloroethene (total)	12 U	*	12 U		12 U									
Chloroform	12 U	*	12 U		12 U									
1,2-Dichloroethane	12 U	*	12 U		12 U									
2-Butanone	12 U	*	12 U		12 U									
1,1,1-Trichloroethane	12 U	*	12 U		12 U									
Carbon tetrachloride	12 U	*	12 U		12 U									
Bromodichloromethane	12 U	*	12 U		12 U									
1,2-Dichloropropane	12 U	*	12 U		12 U									
cis-1,3-Dichloropropene	12 U	*	12 U		12 U									
Trichloroethene	12 U	*	12 U		12 U									
Dibromochloromethane	12 U	*	12 U		12 U									
1,1,2-Trichloroethane	12 U	*	12 U		12 U									
Benzene	12 U	*	12 U		12 U									
trans-1,3-Dichloropropene	12 U	*	12 U		12 U									
Bromoform	12 U	*	12 U		12 U									
4-Methyl-2-pentanone	12 U	*	12 UJv		12 U									
2-Hexanone	12 U	*	12 UJv		12 U									
Tetrachloroethene	12 U	*	12 UJv		12 U									
1,1,2,2-Tetrachloroethane	12 U	*	12 UJv		12 U									
Toluene	12 U	*	12 UJv		12 U									
Chlorobenzene	12 U	*	12 UJv		12 U									
Ethylbenzene	12 U	*	12 UJv		12 U									
Styrene	12 U	*	12 UJv		12 U									
Xylenes (total)	12 U	*	12 UJv		12 U									
Sample wt (g):	5		5		5									
%Moisture:	18		18		18									
Dilution Factor:	1		1		1									
Level:	LOW		LOW		LOW									
Number of TIC's:	0		0		0									

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615989

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G02		FF-G03		FF-G04		FF-G05		FF-G06		FF-G06RE		FF-G07	
Phenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
bis(2-Chloroethyl)ether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Chlorophenol	400	U	390	U	42	J	410	U	420	U *	420	UJv	440	U
1,3-Dichlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
1,4-Dichlorobenzene	400	U	390	U	29	J	410	U	420	U *	420	UJv	440	U
1,2-Dichlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Methylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,2'-Oxybis(1-chloropropane)	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Methylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
N-Nitroso-di-n-propylamine	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachloroethane	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Nitrobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Isophorone	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Nitrophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dimethylphenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
bis(2-Chloroethoxy)methane	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dichlorophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
1,2,4-Trichlorobenzene	400	U	390	U	27	J	410	U	420	U *	420	UJv	440	U
Naphthalene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chloroaniline	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachlorobutadiene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chloro-3-methylphenol	400	U	390	U	34	J	410	U	420	U *	420	UJv	440	U
2-Methylnaphthalene	400	U	390	U	420	U	60	J	420	U *	420	UJv	440	U
Hexachlorocyclopentadiene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4,6-Trichlorophenol	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4,5-Trichlorophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
2-Chloronaphthalene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Dimethylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Acenaphthylene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,6-Dinitrotoluene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
3-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Acenaphthene	400	U	390	U	32	J	22	J	420	U *	420	UJv	440	U
2,4-Dinitrophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
4-Nitrophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Dibenzofuran	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
2,4-Dinitrotoluene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Diethylphthalate	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Chlorophenyl-phenylether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Fluorene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Nitroaniline	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
4,6-Dinitro-2-methylphenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
N-Nitrosodiphenylamine	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
4-Bromophenyl-phenylether	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Hexachlorobenzene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U
Pentachlorophenol	1000	U	990	U	1000	U	1000	U	1100	U *	1100	UJv	1100	U
Phenanthrene	400	U	390	U	420	U	220	J	46	*	420	UJv	440	U
Anthracene	400	U	390	U	420	U	410	U	420	U *	420	UJv	440	U

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G02	FF-G03	FF-G04	FF-G05	FF-G06	FF-G06RE	FF-G07
Carbazole	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Di-n-butylphthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Fluoranthene	400 U	390 U	420 U	130 J	420 U *	420 UJv	440 U
Pyrene	400 U	390 U	420 U	180 J	420 U *	420 UJv	440 U
Butylbenzylphthalate	35 J	36 J	34 J	57 J	420 U *	420 UJv	45 J
3,3'-Dichlorobenzidine	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(a)anthracene	400 U	390 U	420 U	100 J	420 U *	420 UJv	440 U
Chrysene	400 U	390 U	420 U	150 J	420 U *	420 UJv	440 U
bis(2-Ethylhexyl)phthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Di-n-octylphthalate	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(b)fluoranthene	400 U	390 U	420 U	90 J	420 U *	420 UJv	440 U
Benzo(k)fluoranthene	400 U	390 U	420 U	84 J	420 U *	420 UJv	440 U
Benzo(a)pyrene	400 U	390 U	420 U	100 J	420 U *	420 UJv	440 U
Indeno(1,2,3-cd)pyrene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Dibenz(a,h)anthracene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Benzo(g,h,i)perylene	400 U	390 U	420 U	410 U	420 U *	420 UJv	440 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	16	21	19	22	22	25
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	10	9	9	22	20	35	33

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5615991

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G08	FF-G09	FF-G09RE	FF-G10	FF-G11	FF-G12	FF-G13
Phenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
bis(2-Chloroethyl)ether	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Chlorophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,3-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,4-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,2-Dichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,2'-Oxybis(1-chloropropane)	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
N-Nitroso-di-n-propylamine	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachloroethane	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Nitrobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Isophorone	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Nitrophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,4-Dimethylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
bis(2-Chloroethoxy)methane	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2,4-Dichlorophenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
1,2,4-Trichlorobenzene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Naphthalene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Chloroaniline	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachlorobutadiene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
4-Chloro-3-methylphenol	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
2-Methylnaphthalene	430 U	460 U *	460 U	400 U	410 U	410 U	380 U
Hexachlorocyclopentadiene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4,6-Trichlorophenol	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4,5-Trichlorophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
2-Chloronaphthalene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Dimethylphthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Acenaphthylene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,6-Dinitrotoluene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
3-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Acenaphthene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4-Dinitrophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
4-Nitrophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Dibenzofuran	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
2,4-Dinitrotoluene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Diethylphthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Chlorophenyl-phenylether	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Fluorene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Nitroaniline	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
4,6-Dinitro-2-methylphenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
N-Nitrosodiphenylamine	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
4-Bromophenyl-phenylether	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Hexachlorobenzene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Pentachlorophenol	1100 U	1200 U	1200 U *	1000 U	1000 U	1000 U	960 U
Phenanthrene	210 J	460 U	460 U *	400 U	410 U	34 J	380 U
Anthracene	430 U	460 U	460 U *	400 U	410 U	410 U	380 U

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G08	FF-G09	FF-G09RE	FF-G10	FF-G11	FF-G12	FF-G13
Carbazole	46 J	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-butylphthalate	430 U	460 U	460 U *	400 U	410 U	23 J	380 U
Fluoranthene	240 J	460 U	460 U *	400 U	410 U	68 J	380 U
Pyrene	170 J	49 J	43 *	400 U	410 U	62 J	380 U
Butylbenzylphthalate	48 J	29 J	32 *	400 U	25 J	21 J	380 U
3,3'-Dichlorobenzidine	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Benzo(a)anthracene	430 U	460 U	460 U *	400 U	410 U	36 J	380 U
Chrysene	96 J	49 J	44 *	400 U	410 U	50 J	380 U
bis(2-Ethylhexyl)phthalate	430 U	460 U	460 U *	400 U	410 U	410 U	380 U
Di-n-octylphthalate	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(b)fluoranthene	430 U	31 J	29 *	400 U	410 U	42 J	380 U
Benzo(k)fluoranthene	430 U	31 J	29 *	400 U	410 U	51 J	380 U
Benzo(a)pyrene	430 U	27 J	24 *	400 U	410 U	36 J	380 U
Indeno(1,2,3-cd)pyrene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Dibenz(a,h)anthracene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Benzo(g,h,i)perylene	430 U	460 UJv	460 U *	400 U	410 U	410 U	380 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	23	29	29	18	19	20	14
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	35	33	28	21	35	26	35

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

5915993

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G14		FF-G15		FF-G15RE		FF-G16		FF-G16RE		FF-G17		FF-G17RE	
Phenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
bis(2-Chloroethyl)ether	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Chlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,3-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,4-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,2-Dichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Methylphenol	400	U	380	U	380	U *	61	J	57	*	400	U *	400	U
2,2'-Oxybis(1-chloropropane)	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
4-Methylphenol	400	U	380	U	380	U *	94	J	100	*	400	U *	400	U
N-Nitroso-di-n-propylamine	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Hexachloroethane	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Nitrobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Isophorone	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Nitrophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2,4-Dimethylphenol	400	U	380	U	380	U *	360	J	380	*	400	U *	400	U
bis(2-Chloroethoxy)methane	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2,4-Dichlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
1,2,4-Trichlorobenzene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Naphthalene	400	U	81	J	380	U *	430	U	430	U *	400	U *	400	U
4-Chloroaniline	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
Hexachlorobutadiene	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
4-Chloro-3-methylphenol	400	U	380	U	380	U *	430	U	430	U *	400	U *	400	U
2-Methylnaphthalene	400	U	200	J	180	*	430	U	430	*	400	U *	400	U
Hexachlorocyclopentadiene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4,6-Trichlorophenol	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4,5-Trichlorophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
2-Chloronaphthalene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Dimethylphthalate	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Acenaphthylene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,6-Dinitrotoluene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
3-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Acenaphthene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4-Dinitrophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
4-Nitrophenol	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
Dibenzofuran	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
2,4-Dinitrotoluene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Diethylphthalate	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
4-Chlorophenyl-phenylether	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
Fluorene	400	U	380	U	380	U *	430	U	430	U *	400	U	400	U *
4-Nitroaniline	1000	U	950	U	950	U *	1100	U	1100	U *	1000	U	1000	U *
4,6-Dinitro-2-methylphenol	1000	U	950	UJv	950	U *	1100	UJv	1100	U *	1000	U	1000	U *
N-Nitrosodiphenylamine	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
4-Bromophenyl-phenylether	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
Hexachlorobenzene	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *
Pentachlorophenol	1000	U	950	UJv	950	U *	1100	UJv	1100	U *	1000	U	1000	U *
Phenanthrene	400	U	790	J	820	*	430	UJv	430	U *	400	U	400	U *
Anthracene	400	U	380	UJv	380	U *	430	UJv	430	U *	400	U	400	U *

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G14	FF-G15	FF-G15RE	FF-G16	FF-G16RE	FF-G17	FF-G17RE
Carbazole	400 U	380 UJv	380 U *	430 UJv	430 U *	400 U	400 U *
Di-n-butylphthalate	400 U	380 UJv	57 *	430 UJv	100 *	400 U	400 U *
Fluoranthene	400 U	380 UJv	110 *	430 UJv	430 U *	400 U	400 U *
Pyrene	400 U	560 J	590 *	430 UJv	430 U *	25 J	400 U *
Butylbenzylphthalate	400 U	380 UJv	380 U *	100 J	430 U *	53 J	56 *
3,3'-Dichlorobenzidine	400 U	380 UJv	380 U *	430 UJv	430 U *	400 UJv	400 U *
Benzo(a)anthracene	400 U	300 J	280 *	90 J	430 U *	400 UJv	400 U *
Chrysene	400 U	690 J	670 *	430 UJv	110 *	41 J	40 *
bis(2-Ethylhexyl)phthalate	400 U	380 UJv	380 U *	430 UJv	430 U *	400 UJv	62 *
Di-n-octylphthalate	400 U	380 UJv	380 U *	27 J	430 U *	400 UJv	400 U *
Benzo(b)fluoranthene	400 U	230 J	210 *	430 UJv	430 U *	400 UJv	400 U *
Benzo(k)fluoranthene	400 U	380 UJv	58 *	430 UJv	430 U *	400 UJv	400 U *
Benzo(a)pyrene	400 U	250 J	240 *	150 J	160 *	400 UJv	400 U *
Indeno(1,2,3-cd)pyrene	400 U	380 UJv	380 U *	430 UJv	430 U *	400 UJv	400 U *
Dibenz(a,h)anthracene	400 U	380 UJv	380 U *	430 UJv	430 U *	400 UJv	400 U *
Benzo(g,h,i)perylene	400 U	440 J	380 U *	430 UJv	430 U *	400 UJv	400 U *
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	13	13	24	24	18	18
Dilution Factor:	1	1	1	1	1	1	1
Level:	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Number of TIC's:	22	35	35	35	35	29	22

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G18	FF-G18RE	FF-G21	FF-G21RE	FF-G22	FF-G22RE	FF-G23
Phenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethyl)ether	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Chlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,3-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,4-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2-Dichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,2'-Oxybis(1-chloropropane)	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
N-Nitroso-di-n-propylamine	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachloroethane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Nitrobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Isophorone	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Nitrophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dimethylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
bis(2-Chloroethoxy)methane	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2,4-Dichlorophenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
1,2,4-Trichlorobenzene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Naphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloroaniline	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorobutadiene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
4-Chloro-3-methylphenol	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
2-Methylnaphthalene	400 U *	400 U	400 U *	400 U	400 U	400 U *	400 U
Hexachlorocyclopentadiene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,6-Trichlorophenol	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4,5-Trichlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
2-Chloronaphthalene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dimethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Acenaphthylene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,6-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
3-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Acenaphthene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4-Nitrophenol	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
Dibenzofuran	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
2,4-Dinitrotoluene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Diethylphthalate	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Chlorophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
Fluorene	400 U	400 U *	400 U	400 U *	400 U	400 U *	400 U
4-Nitroaniline	1000 U	1000 U *	1000 U	1000 U *	1000 U	1000 U *	1000 U
4,6-Dinitro-2-methylphenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
N-Nitrosodiphenylamine	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
4-Bromophenyl-phenylether	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Hexachlorobenzene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U
Pentachlorophenol	1000 U	1000 U *	1000 U	1000 U *	1000 UJv	1000 U *	1000 U
Phenanthrene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	35 J
Anthracene	400 U	400 U *	400 U	400 U *	400 UJv	400 U *	400 U

015995

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G18		FF-G18RE		FF-G21		FF-G21RE		FF-G22		FF-G22RE		FF-G23	
Carbazole	400	U	400	U *	400	U	400	U *	400	UJv	400	U *	400	U
Di-n-butylphthalate	400	U	400	U *	30	J	27	*	400	UJv	400	U *	400	U
Fluoranthene	400	U	400	U *	400	U	400	U *	400	UJv	400	U *	400	U
Pyrene	38	J	400	U *	26	J	400	U *	400	UJv	400	U *	94	J
Butylbenzylphthalate	45	J	51	*	35	J	400	U *	400	UJv	400	U *	59	J
3,3'-Dichlorobenzidine	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Benzo(a)anthracene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Chrysene	26	J	26	*	22	J	400	U *	400	UJv	400	U *	82	J
bis(2-Ethylhexyl)phthalate	400	UJv	83	*	400	UJv	87	*	400	UJv	400	U *	400	UJv
Di-n-octylphthalate	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	400	UJv
Benzo(b)fluoranthene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	31	J
Benzo(k)fluoranthene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	26	J
Benzo(a)pyrene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	54	J
Indeno(1,2,3-cd)pyrene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	51	J
Dibenz(a,h)anthracene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	26	J
Benzo(g,h,i)perylene	400	UJv	400	U *	400	UJv	400	U *	400	UJv	400	U *	190	J
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	18		18		18		18		18		18		18	
Dilution Factor:	1		1		1		1		1		1		1	
Level:	LOW		LOW		LOW		LOW		LOW		LOW		LOW	
Number of TIC's:	25		17		27		19		31		26		26	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

CRGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G23RE						
Phenol	400 U *						
bis(2-Chloroethyl)ether	400 U *						
2-Chlorophenol	400 U *						
1,3-Dichlorobenzene	400 U *						
1,4-Dichlorobenzene	400 U *						
1,2-Dichlorobenzene	400 U *						
2-Methylphenol	400 U *						
2,2'-Oxybis(1-chloropropane)	400 U *						
4-Methylphenol	400 U *						
N-Nitroso-di-n-propylamine	400 U *						
Hexachloroethane	400 U *						
Nitrobenzene	400 U *						
Isophorone	400 U *						
2-Nitrophenol	400 U *						
2,4-Dimethylphenol	400 U *						
bis(2-Chloroethoxy)methane	400 U *						
2,4-Dichlorophenol	400 U *						
1,2,4-Trichlorobenzene	400 U *						
Naphthalene	400 U *						
4-Chloroaniline	400 U *						
Hexachlorobutadiene	400 U *						
4-Chloro-3-methylphenol	400 U *						
2-Methylnaphthalene	400 U *						
Hexachlorocyclopentadiene	400 U *						
2,4,6-Trichlorophenol	400 U *						
2,4,5-Trichlorophenol	1000 U *						
2-Chloronaphthalene	400 U *						
2-Nitroaniline	1000 U *						
Dimethylphthalate	400 U *						
Acenaphthylene	400 U *						
2,6-Dinitrotoluene	400 U *						
3-Nitroaniline	1000 U *						
Acenaphthene	400 U *						
2,4-Dinitrophenol	1000 U *						
4-Nitrophenol	1000 U *						
Dibenzofuran	400 U *						
2,4-Dinitrotoluene	400 U *						
Diethylphthalate	400 U *						
4-Chlorophenyl-phenylether	400 U *						
Fluorene	400 U *						
4-Nitroaniline	1000 U *						
4,6-Dinitro-2-methylphenol	1000 U *						
N-Nitrosodiphenylamine	400 U *						
4-Bromophenyl-phenylether	400 U *						
Hexachlorobenzene	400 U *						
Pentachlorophenol	1000 U *						
Phenanthrene	35 *						
Anthracene	400 U *						

561599

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

SEMIVOLATILES		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G23RE													
Carbazole	400	U	*											
Di-n-butylphthalate	28		*											
Fluoranthene	23		*											
Pyrene	90		*											
Butylbenzylphthalate	81		*											
3,3'-Dichlorobenzidine	400	U	*											
Benzo(a)anthracene	400	U	*											
Chrysene	77		*											
bis(2-Ethylhexyl)phthalate	79		*											
Di-n-octylphthalate	400	U	*											
Benzo(b)fluoranthene	35		*											
Benzo(k)fluoranthene	41		*											
Benzo(a)pyrene	60		*											
Indeno(1,2,3-cd)pyrene	29		*											
Dibenz(a,h)anthracene	400	U	*											
Benzo(g,h,i)perylene	110		*											
Sample wt (g):	30													
%Moisture:	18													
Dilution Factor:	1													
Level:	LOW													
Number of TIC's:	35													

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G02	FF-G03	FF-G04	FF-G05	FF-G06	FF-G07	FF-G08
alpha-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
beta-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
delta-BHC	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
gamma-BHC (lindane)	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Heptachlor	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Aldrin	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Heptachlor epoxide	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Endosulfan I	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Dieldrin	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDE	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endrin	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endosulfan II	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDD	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endosulfan sulfate	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
4,4'-DDT	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Methoxychlor	21 U	20 U	22 U	21 U	22 U	23 U	22 U
Endrin ketone	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
Endrin aldehyde	4.0 U	3.9 U	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U
alpha-Chlordane	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
gamma-Chlordane	2.1 U	2.0 U	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U
Toxaphene	210 U	200 U	220 U	210 U	220 U	230 U	220 U
Aroclor-1016	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1221	82 U	80 U	85 U	83 U	86 U	89 U	87 U
Aroclor-1232	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1242	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1248	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1254	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Aroclor-1260	40 U	39 U	42 U	41 U	42 U	44 U	43 U
Sample wt (g):	30	30	30	30	30	30	30
%Moisture:	18	16	21	19	22	25	23
Dilution Factor:	1	1	1	1	1	1	1

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG		FLAG
EPA SAMPLE NUMBER:	FF-G09		FF-G10		FF-G11		FF-G12		FF-G13		FF-G14		FF-G15	
alpha-BHC	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
beta-BHC	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
delta-BHC	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
gamma-BHC (lindane)	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
Heptachlor	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.5		2.0	U
Aldrin	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
Heptachlor epoxide	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
Endosulfan I	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	2.0	U
Dieldrin	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	3.8	U
4,4'-DDE	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	3.8	U
Endrin	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	7.5	J
Endosulfan II	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	7.9	
4,4'-DDD	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	3.8	U
Endosulfan sulfate	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	10	UJ
4,4'-DDT	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	3.8	U
Methoxychlor	24	U	21	U	21	U	21	U	20	U	21	U	20	U
Endrin ketone	4.6	U	4.0	U	4.1	U	4.1	U	3.8	U	4.0	U	14	J
Endrin aldehyde	4.6	U	4.0	U	4.1	U	4.7	U	3.8	U	4.0	U	3.8	U
alpha-Chlordane	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	3.6	J
gamma-Chlordane	2.4	U	2.1	U	2.1	U	2.1	U	2.0	U	2.1	U	5.7	
Toxaphene	240	U	210	U	210	U	210	U	200	U	210	U	200	U
Aroclor-1016	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Aroclor-1221	94	U	82	U	83	U	84	U	78	U	82	U	77	U
Aroclor-1232	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Aroclor-1242	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Aroclor-1248	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Aroclor-1254	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Aroclor-1260	46	U	40	U	41	U	41	U	38	U	40	U	38	U
Sample wt (g):	30		30		30		30		30		30		30	
%Moisture:	29		18		19		20		14		18		13	
Dilution Factor:	1		1		1		1		1		1		1	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

ORGANIC DATA SUMMARY

Case No.: 25159 SDG: FFG02 Reviewer: M. Missler

Laboratory: AATS Matrix: SOIL Units: ug/Kg

PESTICIDES/PCBs	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG	FLAG
EPA SAMPLE NUMBER:	FF-G16	FF-G17	FF-G18	FF-G21	FF-G22	FF-G23	
alpha-BHC	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
beta-BHC	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
delta-BHC	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
gamma-BHC (lindane)	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
Heptachlor	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
Aldrin	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
Heptachlor epoxide	2.2 U	2.1	2.9	2.1 U	2.1 U	2.1 U	
Endosulfan I	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	
Dieldrin	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
4,4'-DDE	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
Endrin	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
Endosulfan II	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
4,4'-DDD	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
Endosulfan sulfate	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	5.6 UJ	
4,4'-DDT	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
Methoxychlor	22 U	21 U	21 U	21 U	21 U	21 U	
Endrin ketone	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
Endrin aldehyde	4.3 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	
alpha-Chlordane	2.2 U	2.2 J	3.6 J	2.1 U	2.1 U	2.1 U	
gamma-Chlordane	2.2 U	2.8 UJ	5.9 B	2.1 U	2.1 U	2.1 U	
Toxaphene	220 U	210 U	210 U	210 U	210 U	210 U	
Aroclor-1016	43 U	40 U	40 U	40 U	40 U	40 U	
Aroclor-1221	88 U	82 U	82 U	82 U	82 U	82 U	
Aroclor-1232	43 U	40 U	40 U	40 U	40 U	40 U	
Aroclor-1242	43 U	40 U	40 U	40 U	40 U	40 U	
Aroclor-1248	43 U	40 U	40 U	40 U	40 U	40 U	
Aroclor-1254	43 U	40 U	40 U	40 U	40 U	40 U	
Aroclor-1260	43 U	40 U	40 U	40 U	40 U	40 U	
Sample wt (g):	30	30	30	30	30	30	
%Moisture:	24	18	18	18	18	18	
Dilution Factor:	1	1	1	1	1	1	

Note: For the results listed in the Data Summary Table, ESAT has replaced the laboratory assigned flags with ESAT Organic Data Qualifiers. The ESAT flags indicate the technical usability of the reported results.

5616001

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 25159 SDG No. FFG02 SDG Nos. To Follow SAS No. Date Rec 12/27/96

EPA Lab ID: AATS

Lab Location: Broken Arrow, OK 74012

Region: 6 Audit No.: 25159/FFG02

Re Submitted CSF? Yes _____ No X

Box No(s): 1

COMMENTS:

3 The reviewer clarified the numbering scheme as follows:
SDG narrative was pages 1-35B;
SDG cover sheet/TR were pages 35C-38;
Forms VIII VOA were pages 362-367; and
VOA standards data were pages 178-361.

13 No airbills were available as the samples were delivered in person.

20095502

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?		X	
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?			X
14. Signed?			X
15. Dated?			X
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: Maria Missler Maria Missler / ESAT Data Reviewer Date 1/2/97

Audited by: _____ _____ Date _____

Audited by: _____ _____ Date _____

Signature Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: _____ Date Entered: _____ Date Reviewed: _____

Entered by: _____ _____

Reviewed by: _____ _____

Signature Printed Name/Title

DC-2___

In Reference to Case No(s):
25159 SDG: FFG02 (O-1780)

5616003

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
FAX Record Log

Date of FAX: January 10, 1997
Laboratory Name: AATS
Lab Contact: Harry Borg

Region: 6
Regional Contact: Maria Missler - ESAT

FAX initiated by: _____Laboratory __X__Region

In reference to data for the following fractions:

BNA Pest/PCB

Summary of Questions/Issues:

A. BNA

1. Sample FF-G11, Form I SV-TIC: The TIC's at 22.326 and 22.595 min. were assigned the same CAS number and compound name. Please revise and resubmit this form.

2. Sample FF-G17RE, Form I SV-TIC: The TIC's at 12.764 and 13.089 min. were assigned the same CAS number and compound name. Please revise and resubmit this form.

3. Sample FF-G16: On the quantitation report, the peak identified as benzo(a)anthracene better matches the retention time identification criteria for chrysene. Please correct and resubmit the quantitation and results reports.

4. The following peaks appear to meet the TIC intensity criteria but were not reported. Please revise Forms I SV-TIC to include these peaks or explain:

Sample	Approximate peak RT (min)
FF-G03	11.4, 12.0
FF-G04	4.95, 11.7, 12.2
FF-G07	4.4
FF-G10	7.6

5. Form V SV, page 464: According to the analysis log (page 2682), the sample analyzed on 12/12/96 at 0029 was identified as "FF-G01", not FF-G06 as reported on this form. Please clarify this discrepancy.

FAX COMMUNICATION LOG

Continuation Page 2
Laboratory/Contact AATS / Harry Borg
In Reference To Case No. 25159 **SDG:** FFG02

BC Pest/PCB

1. Forms VI PEST-2, pages 2327, 2328, 2329, and 2330: The reviewer was unable to reproduce the calibration factors reported for the two surrogates based on the raw data (pages 2396-2409 and 2449-2462). Please correct and resubmit these forms to match the raw data or demonstrate your calculations.

2. Method blank PBLKSC, page 2490: According to the SOW (OLM03.0, D-73/PEST, 12.1.2.4) the method blank acceptance criteria apply independently to each analytical column. The integration report (page 2490) shows the presence of endosulfan sulfate on column DB-17 above the CRQL. Please comment on this non-compliance.

NOTE: Any laboratory resubmission should be submitted either as an addendum to the original CSF with a revised Form DC-2 or submitted as a new CSF with a new Form DC-2 (OLM03.0, p. B-29), except those containing only replacement pages. Custody seals are required for all CSF resubmission shipments.

Please respond to the above items. Region 6 resubmissions may be included with CCS response or sent separately **within 7 days** to:

Mr. Mahmoud El-Feky
U.S. EPA Region 6 Laboratory
10625 Fallstone Road
Houston, TX 77099

If you have any questions, please contact me at (713) 988-2995.

Maria Klisser
Signature

January 10, 1997
Date

Distribution: (1) Lab Copy (2) Region Copy

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

FFG16

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10137.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	21.700	670	J
2.		UNKNOWN PAH	22.117	480	J
3.		UNKNOWN	22.425	220	J
4.		UNKNOWN	22.604	380	J
5.		UNKNOWN	22.861	240	J
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

2012002
56169006

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG16RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10196.D

Level: (low/med) LOW Date Received: 11/18/96 DY 12/04/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	430	U
111-44-4	bis(2-Chloroethyl)Ether	430	U
95-57-8	2-Chlorophenol	430	U
541-73-1	1,3-Dichlorobenzene	430	U
106-46-7	1,4-Dichlorobenzene	430	U
95-50-1	1,2-Dichlorobenzene	430	U
95-48-7	2-Methylphenol	57	J
108-60-1	2,2'-oxybis(1-Chloropropane)	430	U
106-44-5	4-Methylphenol	100	J
621-64-7	N-Nitroso-di-n-propylamine	430	U
67-72-1	Hexachloroethane	430	U
98-95-3	Nitrobenzene	430	U
78-59-1	Isophorone	430	U
88-75-5	2-Nitrophenol	430	U
105-67-9	2,4-Dimethylphenol	380	J
111-91-1	bis(2-Chloroethoxy)methane	430	U
120-83-2	2,4-Dichlorophenol	430	U
120-82-1	1,2,4-Trichlorobenzene	430	U
91-20-3	Naphthalene	430	U
106-47-8	4-Chloroaniline	430	U
87-68-3	Hexachlorobutadiene	430	U
59-50-7	4-Chloro-3-Methylphenol	430	U
91-57-6	2-Methylnaphthalene	430	U
77-47-4	Hexachlorocyclopentadiene	430	U
88-06-2	2,4,6-Trichlorophenol	430	U
95-95-4	2,4,5-Trichlorophenol	1100	U
91-58-7	2-Chloronaphthalene	430	U
88-74-4	2-Nitroaniline	1100	U
131-11-3	Dimethylphthalate	430	U
208-96-8	Acenaphthylene	430	U
606-20-2	2,6-Dinitrotoluene	430	U
99-09-2	3-Nitroaniline	1100	U
83-32-9	Acenaphthene	430	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG16RE

561608

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10196.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1100	U
100-02-7	4-Nitrophenol	1100	U
132-64-9	Dibenzofuran	430	U
121-14-2	2,4-Dinitrotoluene	430	U
84-66-2	Diethylphthalate	430	U
7005-72-3	4-Chlorophenyl-phenylether	430	U
86-73-7	Fluorene	430	U
100-01-6	4-Nitroaniline	1100	U
534-52-1	4,6-Dinitro-2-methylphenol	1100	U
86-30-6	N-Nitrosodiphenylamine (1)	430	U
101-55-3	4-Bromophenyl-phenylether	430	U
118-74-1	Hexachlorobenzene	430	U
87-86-5	Pentachlorophenol	1100	U
85-01-8	Phenanthrene	430	U
120-12-7	Anthracene	430	U
86-74-8	Carbazole	430	U
84-74-2	Di-n-butylphthalate	100	JB
206-44-0	Fluoranthene	430	U
129-00-0	Pyrene	430	U
85-68-7	Butylbenzylphthalate	430	U
91-94-1	3,3'-Dichlorobenzidine	430	U
56-55-3	Benzo(a)anthracene	430	U
218-01-9	Chrysene	110	J
117-81-7	bis(2-Ethylhexyl)phthalate	430	U
117-84-0	Di-n-octylphthalate	430	U
205-99-2	Benzo(b)fluoranthene	430	U
207-08-9	Benzo(k)fluoranthene	430	U
50-32-8	Benzo(a)pyrene	160	J
193-39-5	Indeno(1,2,3-cd)pyrene	430	U
53-70-3	Dibenz(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	430	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG16RE

5616009

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10196.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96 DH 12/24/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN ORGANIC ACID	3.104	1500	J
2.		UNKNOWN	3.154	130	J
3.		UNKNOWN	3.478	530	JB
4.		UNKNOWN	3.666	360	JB
5.		UNKNOWN	3.803	550	J
6.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.981	2200	NJAB
7.		UNKNOWN	4.060	380	JB
8.		UNKNOWN	4.168	110	J
9.		UNKNOWN	4.247	210	J
10.		UNKNOWN	4.709	270	J
11.		UNKNOWN	4.926	170	J
12.		(5H)-Furanone, -dimethyl-	5.143	130	J
13.		-Hexen--one, -methyl-	5.261	140	J
14.		UNKNOWN	7.180	180	J
15.		Phenol, -ethyl-	7.732	100	J
16.		UNKNOWN	14.630	260	J
17.		UNKNOWN	15.273	320	J
18.		UNKNOWN	15.590	300	J
19.		UNKNOWN	15.977	240	JB
20.		Phenol, '-(1-methylethyliden	16.414	500	J
21.		UNKNOWN	16.821	650	J
22.		UNKNOWN	17.288	550	J
23.		UNKNOWN	18.251	510	J
24.		UNKNOWN	19.720	290	J
25.		UNKNOWN	19.909	250	J
26.		UNKNOWN	20.087	760	J
27.		UNKNOWN	20.167	280	J
28.		UNKNOWN	20.296	450	J
29.		UNKNOWN	20.603	360	J
30.		UNKNOWN	20.951	460	J

1F

EPA SAMPLE NO.

FFG16RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10196.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96

% Moisture: 24 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4

Number TICs found: 35 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown	21.050	630	J
2.		UNKNOWN	21.248	380	J
3.		UNKNOWN	21.416	260	J
4.		UNKNOWN	21.456	380	J
5.		Bicyclo[2.2.1]heptan-2-one,	21.813	570	J
6.					
7.					
8.					
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5616010

12/24/96

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG17

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10294.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616011

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG17

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10294.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616012

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	25	J
85-68-7	Butylbenzylphthalate	53	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	41	J
117-81-7	bis(2-Ethylhexyl)phthalate	65	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG17

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10294.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616013

Number TICs found: 29

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN ALKENE	3.351	100	J
2.		UNKNOWN	3.657	160	J
3.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.825	910	NJAB
4.		UNKNOWN	3.913	120	J
5.		UNKNOWN	3.943	150	J
6.		UNKNOWN	3.973	140	J
7.		UNKNOWN	4.535	110	J
8.		UNKNOWN	4.742	680	J
9.		UNKNOWN	4.959	250	JB
10.		UNKNOWN	5.078	130	JB
11.		UNKNOWN	6.114	160	J
12.		UNKNOWN	6.183	410	J
13.		UNKNOWN	7.583	120	J
14.	0-00-0	Linalyl propanoate	7.850	86	NJ
15.	13049-35-9	1,1'-Biphenyl, 2,2'-diethyl-	12.810	410	NJ
16.		UNKNOWN PAH	13.136	220	J
17.		UNKNOWN ORGANIC ACID	14.391	150	J
18.		UNKNOWN ORGANIC ACID	14.460	640	J
19.	57-10-3	Hexadecanoic acid	14.520	440	NJ
20.	112-80-1	Oleic Acid	15.756	510	NJ
21.	57-11-4	Octadecanoic acid	15.845	92	NJ
22.		UNKNOWN ORGANIC ACID	17.826	440	J
23.		-Tridecatrienenitrile, -trim	19.613	520	J
24.		UNKNOWN	21.331	370	J
25.		UNKNOWN	21.967	760	J
26.		-Naphthoquinone, -ethyl--dih	22.066	650	J
27.		UNKNOWN PAH	22.096	880	J
28.	83-47-6	.gamma.-Sitosterol	22.255	1100	NJ
29.		UNKNOWN	22.742	380	J
30.					

√

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG17RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10327.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616014

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG17RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10327.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616015

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	56	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	40	J
117-81-7	bis(2-Ethylhexyl)phthalate	62	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG17RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10327.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616016

Number TICs found: 22

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.627	94	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.785	830	NJAB
3.		UNKNOWN ALCOHOL	3.873	110	J
4.		UNKNOWN	4.505	93	J
5.		UNKNOWN	4.712	680	J
6.		UNKNOWN	4.929	220	JB
7.		UNKNOWN	5.047	150	JB
8.		UNKNOWN	6.083	140	J
9.		UNKNOWN	6.142	280	J
10.		UNKNOWN	7.541	120	J
11.	13049-35-9	1,1'-Biphenyl, 2,2'-diethyl-	12.764	400	NJ
12.	13049-35-9	1,1'-Biphenyl, 2,2'-diethyl-	13.089	230	NJ
13.		UNKNOWN ORGANIC ACID	14.341	130	J
14.		UNKNOWN ORGANIC ACID	14.421	520	J
15.		UNKNOWN ORGANIC ACID	14.480	370	J
16.		UNKNOWN ORGANIC ACID	15.713	430	J
17.		-Dodecatrien--ol, -trimethy	19.567	750	JB
18.		UNKNOWN	21.148	410	J
19.		UNKNOWN PAH	21.909	670	J
20.		UNKNOWN	21.998	720	J
21.		UNKNOWN	22.028	1000	J
22.		UNKNOWN	22.216	800	J
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25.					
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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG18

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10295.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

561017

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG18

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10295.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

35 6018

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	✓38	J
85-68-7	Butylbenzylphthalate	45	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	26	J
117-81-7	bis(2-Ethylhexyl)phthalate	✓80	JB
117-84-0	Di-n-octylphthalate	✓400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG18

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10295.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

Number TICs found: 25

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.657	100	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.814	780	NJAB
3.		UNKNOWN	3.903	100	J
4.		UNKNOWN	3.943	110	J
5.		UNKNOWN	4.742	530	J
6.		UNKNOWN	4.959	290	JB
7.		UNKNOWN	5.077	140	JB
8.		UNKNOWN	6.113	150	J
9.		UNKNOWN	6.182	320	J
10.		UNKNOWN	7.582	120	J
11.		UNKNOWN ORGANIC ACID	14.387	160	J
12.		UNKNOWN ORGANIC ACID	14.466	670	J
13.		UNKNOWN ORGANIC ACID	14.526	540	J
14.	112-80-1	Oleic Acid	15.751	540	NJ
15.		UNKNOWN ORGANIC ACID	15.841	280	J
16.		-Tridecatrienenitrile, -trim	19.613	480	J
17.		UNKNOWN	21.198	340	J
18.		UNKNOWN	21.972	780	J
19.		UNKNOWN PAH	22.061	560	J
20.		UNKNOWN PAH	22.091	1400	J
21.		UNKNOWN	22.260	440	J
22.		UNKNOWN	22.280	460	J
23.		UNKNOWN	22.647	310	J
24.		UNKNOWN	22.865	410	J
25.		UNKNOWN	22.964	320	J
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG18RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10328.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5619020

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG18RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10328.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

55,621

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	51	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	26	J
117-81-7	bis(2-Ethylhexyl)phthalate	83	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG18RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10328.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616022

Number TICs found: 17

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.784	700	NJAB
2.		UNKNOWN	4.711	520	J
3.		UNKNOWN	4.928	250	JB
4.		UNKNOWN	5.047	160	JB
5.		UNKNOWN	6.082	140	J
6.		UNKNOWN	6.142	210	J
7.		UNKNOWN	7.541	120	J
8.		UNKNOWN	14.350	130	J
9.	2091-29-4	9-Hexadecenoic acid	14.429	600	NJ
10.	57-10-3	Hexadecanoic acid	14.489	460	NJ
11.		UNKNOWN ORGANIC ACID	15.712	460	J
12.		UNKNOWN ORGANIC ACID	15.801	210	J
13.		-Dodecatrien--ol, -trimethy	19.566	750	JB
14.		UNKNOWN PAH	21.908	590	J
15.		UNKNOWN PAH	21.997	930	J
16.		UNKNOWN	22.026	700	J
17.		UNKNOWN	22.214	590	J
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG21

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10296.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616023

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG21

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10296.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616024

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	30	J
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	26	J
85-68-7	Butylbenzylphthalate	35	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	22	J
117-81-7	bis(2-Ethylhexyl)phthalate	√ 67	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG21

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10296.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616025

Number TICs found: 27

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.657	160	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.815	860	NJAB
3.		UNKNOWN	3.913	140	J
4.		UNKNOWN	3.943	150	J
5.		UNKNOWN	4.535	91	J
6.		UNKNOWN	4.604	88	J
7.		-Hydroxy--oxohexanoic acid l	4.742	790	J
8.		UNKNOWN	4.959	320	JB
9.		UNKNOWN	5.078	130	JB
10.		UNKNOWN	6.104	120	J
11.		UNKNOWN	6.183	280	J
12.		UNKNOWN	7.583	160	J
13.		-Cyclohexene--methanol,	7.849	82	J
14.		UNKNOWN ORGNAIC ACID	14.399	200	J
15.		UNKNOWN ORGANIC ACID	14.478	890	J
16.	57-10-3	Hexadecanoic acid	14.528	600	NJ
17.		UNKNOWN ORGANIC ACID	15.734	400	J
18.	112-80-1	Oleic Acid	15.764	410	NJ
19.	57-11-4	Octadecanoic acid	15.853	350	NJ
20.	57-88-5	Cholesterol	21.332	330	NJ
21.		UNKNOWN	21.828	290	J
22.		UNKNOWN	21.977	420	J
23.		UNKNOWN PAH	22.066	300	J
24.		UNKNOWN	22.096	450	J
25.		UNKNOWN	22.652	400	J
26.		UNKNOWN	22.871	330	J
27.		Androst--en--one, -hydroxy-,	22.970	310	J
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG21RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10329.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616026

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene	370 U						
1,2-Dichlorobenzene	370 U						
1,3-Dichlorobenzene	370 U						
1,4-Dichlorobenzene	370 U						
2,2'-Oxybis(1-chloropropane)	370 U						
2,4,5-Trichlorophenol	920 U						
2,4,6-Trichlorophenol	370 U						
2,4-Dichlorophenol	370 U						
2,4-Dimethylphenol	370 U						
2,4-Dinitrophenol	920 U						
2,4-Dinitrotoluene	370 U						
2,6-Dinitrotoluene	370 U						
2-Chloronaphthalene	370 U						
2-Chlorophenol	370 U						
2-Methylnaphthalene	370 U						
2-Methylphenol	370 U						
2-Nitroaniline	920 U						
2-Nitrophenol	370 U						
3,3'-Dichlorobenzidine	370 U						
3-Nitroaniline	920 U						
4,6-Dinitro-2-methylphenol	920 U						
4-Bromophenyl-phenylether	370 U						
4-Chloro-3-methylphenol	370 U						
4-Chloroaniline	370 U						
4-Chlorophenyl-phenylether	370 U					9909199	

Detected Values are Shaded

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1F

EPA SAMPLE NO.

FFG21RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10329.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/10/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

5616028

Number TICs found: 19

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.627	120	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.785	760	NJAB
3.		UNKNOWN ALCOHOL	3.883	110	J
4.		UNKNOWN	3.913	110	J
5.		-Hydroxy--oxohexanoic acid 1	4.712	730	J
6.		UNKNOWN	4.929	270	JB
7.		UNKNOWN	5.047	140	JB
8.		UNKNOWN	6.073	110	J
9.		UNKNOWN	6.142	170	J
10.		UNKNOWN	7.541	150	J
11.		UNKNOWN	14.350	150	J
12.		UNKNOWN ORGANIC ACID	14.429	760	J
13.		UNKNOWN ORGANIC ACID	14.489	500	J
14.		UNKNOWN ORGANIC ACID	15.682	300	J
15.		UNKNOWN ORGANIC ACID	15.712	310	J
16.		UNKNOWN ORGANIC ACID	15.801	270	J
17.		-Dodecatrien--ol, -trimethy	19.561	490	JB
18.		UNKNOWN	21.989	370	J
19.		UNKNOWN	22.029	380	J
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG22

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10138.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

5616629

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG22

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10138.D

Level: (low/med) LOW Date Received: 11/18/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

5616930

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG22

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10138.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

Number TICs found: 31

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.281	420	J
2.		UNKNOWN	3.655	600	JB
3.		UNKNOWN	3.852	180	J
4.		UNKNOWN	3.990	360	JB
5.		UNKNOWN	4.059	180	JB
6.	20818-81-9	Propanal, 2-hydroxy-2-methyl	4.158	1900	NJA
7.		UNKNOWN	4.236	260	J
8.		UNKNOWN	4.286	90	J
9.		UNKNOWN	4.443	330	J
10.		UNKNOWN	4.926	180	J
11.		-Hexen--one, -methyl-	5.359	140	J
12.		UNKNOWN	14.913	100	J
13.		UNKNOWN	18.311	320	J
14.		UNKNOWN	18.478	300	J
15.		UNKNOWN	20.106	180	J
16.		UNKNOWN	20.204	240	J
17.		UNKNOWN	20.362	210	J
18.		UNKNOWN	20.787	210	J
19.		UNKNOWN	21.211	220	J
20.		UNKNOWN	21.557	360	J
21.		UNKNOWN	22.189	270	J
22.		UNKNOWN	22.407	180	J
23.		UNKNOWN	22.555	490	J
24.		UNKNOWN	22.663	580	J
25.		UNKNOWN	22.703	780	J
26.		UNKNOWN	22.920	480	J
27.		UNKNOWN	23.147	180	J
28.		UNKNOWN	23.296	380	J
29.		UNKNOWN	23.552	1000	J
30.		UNKNOWN	23.641	330	J

5616031

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

FFG22

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10138.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

Number TICs found: 31

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	24.924	180	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
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24.					
25.					
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27.					
28.					
29.					
30.					

5616032

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG22RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10197.D

Level: (low/med) LOW Date Received: 11/18/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

5616033

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG22RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10197.D

Level: (low/med) LOW Date Received: 11/18/96 (12/4/96)

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

5616034

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG22RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10197.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/05/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8

Number TICs found: 26

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.095	290	J
2.		UNKNOWN	3.478	470	JB
3.		UNKNOWN	3.665	190	JB
4.		UNKNOWN	3.803	320	J
5.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.971	1700	NJAB
6.		UNKNOWN	4.049	210	JB
7.		UNKNOWN	4.167	96	J
8.		UNKNOWN	4.246	190	J
9.		UNKNOWN	4.709	180	J
10.		UNKNOWN	4.925	120	J
11.		UNKNOWN	5.142	120	JB
12.		UNKNOWN	6.392	83	J
13.		UNKNOWN	14.666	160	J
14.		UNKNOWN	14.726	130	J
15.		Unknown	16.409	510	J
16.		Unknown	18.201	410	J
17.		UNKNOWN	20.103	490	J
18.		UNKNOWN	21.030	760	J
19.		UNKNOWN	21.474	390	J
20.		UNKNOWN	22.253	470	J
21.		UNKNOWN	22.342	820	J
22.		UNKNOWN	22.382	1100	J
23.		UNKNOWN	22.589	750	J
24.		UNKNOWN	22.825	440	J
25.		UNKNOWN	23.190	1500	J
26.		UNKNOWN	23.289	460	J
27.					
28.					
29.					
30.					

5616035

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG23

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10220.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

5A16036

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG23

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10220.D

Level: (low/med) LOW Date Received: 11/18/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

12/24/96

961037

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	35	J
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	29	JB
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	94	J
85-68-7	Butylbenzylphthalate	59	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	82	J
117-81-7	bis(2-Ethylhexyl)phthalate	62	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	31	J
207-08-9	Benzo(k)fluoranthene	26	J
50-32-8	Benzo(a)pyrene	54	J
193-39-5	Indeno(1,2,3-cd)pyrene	51	J
53-70-3	Dibenz(a,h)anthracene	26	J
191-24-2	Benzo(g,h,i)perylene	190	J

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG23

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10220.D

Level: (low/med) LOW Date Received: 11/18/96 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

16038

Number TICs found: 26

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	115-19-5	3-Butyn-2-ol, 2-methyl-	3.421	1000	NJ
2.		UNKNOWN	3.598	220	JB
3.		-Pentene, -methyl-	3.737	800	J
4.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.905	2100	NJAB
5.		UNKNOWN AMIDE	3.983	490	J
6.	694-87-1	Bicyclo[4.2.0]octa-1,3,5-tri	4.418	160	NJ
7.		UNKNOWN	4.615	450	J
8.	110-13-4	2,5-Hexanedione	4.793	130	NJ
9.		UNKNOWN	4.823	270	J
10.		UNKNOWN	5.040	170	JB
11.		UNKNOWN	6.274	84	J
12.		UNKNOWN	6.520	85	J
13.		UNKNOWN	14.473	140	J
14.		-Pentadecenoic acid	14.543	220	J
15.	57-10-3	Hexadecanoic acid	14.593	230	NJ
16.		Pyrene, -methyl-	16.876	96	J
17.		Pyrene, -methyl-	17.038	180	J
18.		Benzaldehyde, -benzyloxy--fl	17.937	910	J
19.		UNKNOWN	18.768	300	J
20.		UNKNOWN	20.807	320	J
21.		UNKNOWN	22.186	530	J
22.		UNKNOWN	22.216	980	J
23.		Urs--ene, -methoxy-, (.beta.	22.419	590	J
24.		UNKNOWN	22.784	430	J
25.		UNKNOWN	23.007	1200	J
26.		Stigmast--en--one	23.108	580	J
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG23RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10260.D

Level: (low/med) LOW Date Received: 11/~~19~~17/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400	U
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	400	U

FORM I SV-1 OLM03.0

1818

000845

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG23RE

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10260.D

Level: (low/med) LOW Date Received: 11/~~19~~18/96 pt 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

5616040

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1000	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	1000	U
85-01-8	Phenanthrene	35	J
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	28	JB
206-44-0	Fluoranthene	23	J
129-00-0	Pyrene	90	J
85-68-7	Butylbenzylphthalate	81	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	77	J
117-81-7	bis(2-Ethylhexyl)phthalate	79	JB
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	35	J
207-08-9	Benzo(k)fluoranthene	41	J
50-32-8	Benzo(a)pyrene	60	J
193-39-5	Indeno(1,2,3-cd)pyrene	29	J
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	110	J

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

FFG23RE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10260.D

Level: (low/med) LOW Date Received: 11/18/96 12/04/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

5616041

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	3.371	600	J
2.		-Buten--ol, -dimethyl-	3.559	180	J
3.		UNKNOWN	3.687	450	J
4.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.865	2300	NJAB
5.	5076-20-0	Oxirane, tetramethyl-	3.944	450	NJ
6.		UNKNOWN	4.566	190	J
7.		UNKNOWN	4.774	340	J
8.		(5H)-Furanone, -dimethyl-	5.001	160	J
9.		-Penten--one, -dimethyl-	5.129	94	J
10.		UNKNOWN	6.472	97	J
11.		UNKNOWN ORGANIC ACID	11.816	86	J
12.	109-29-5	Oxacycloheptadecan-2-one	14.505	340	NJ
13.	57-10-3	Hexadecanoic acid	14.566	300	NJ
14.		UNKNOWN	15.431	84	J
15.		-Octadecadienal, ()-	15.784	210	J
16.		UNKNOWN ORGANIC ACID	15.814	190	J
17.	57-11-4	Octadecanoic acid	15.905	180	NJ
18.		UNKNOWN PAH	16.208	200	J
19.		Pyrene, -methyl-	16.834	220	J
20.		Pyrene, -methyl-	16.996	460	J
21.		Pyrene, -dimethyl-	17.726	190	J
22.		UNKNOWN	17.888	520	J
23.	84-15-1	o-Terphenyl	17.939	220	NJ
24.		UNKNOWN	18.365	160	J
25.		(-Tetramethylhexadeca-1,	19.677	260	J
26.		UNKNOWN	19.890	270	J
27.		UNKNOWN	19.992	260	J
28.		UNKNOWN	20.756	370	J
29.		UNKNOWN	22.046	380	J
30.		Olean--ene	22.138	470	J

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FFG23RE

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11RA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10260.D

Level: (low/med) LOW Date Received: 11/18/96 pt 12/24/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/09/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6

5616042

Number TICs found: 35

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	22.168	730	J
2.		Urs--ene, -methoxy-, (.beta.	22.360	360	J
3.		UNKNOWN	22.725	270	J
4.		UNKNOWN	22.948	860	J
5.		Stigmast--en-one	23.049	290	J
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
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30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1119SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10216.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/07/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616043

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK1

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1119SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10216.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/07/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616044

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	830	U
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	21	J
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	22	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	42	J
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SBLK1

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1119SB

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10216.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/07/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616045

Number TICs found: 17

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		-Pentene, -dimethyl-	3.450	82	J
2.		UNKNOWN	3.568	590	J
3.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.904	1600	NJA
4.		UNKNOWN	4.052	70	J
5.		UNKNOWN	5.038	150	J
6.		UNKNOWN	5.156	180	J
7.	111-90-0	Ethanol, 2-(2-ethoxyethoxy)-	5.679	67	NJ
8.		'-Biphenyl, '-diethyl-	12.912	270	J
9.		UNKNOWN	13.198	73	J
10.		UNKNOWN	13.238	160	J
11.		UNKNOWN AMIDE	14.728	130	J
12.		UNKNOWN	16.002	150	J
13.		UNKNOWN AMIDE	16.110	220	J
14.		UNKNOWN AMIDE	17.276	2200	J
15.		UNKNOWN AMIDE	17.376	150	J
16.		UNKNOWN AMIDE	19.519	1200	J
17.		.Psi.,.psi.-Carotene,	19.708	350	J
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1120SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10248.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616046

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1120SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10248.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616047

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	830	U
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	21	J
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK2

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1120SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10248.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted: 11/20/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/08/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616048

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-Pentanone, 4-hydroxy-4-met	3.835	840	NJA
2.		UNKNOWN	4.989	330	J
3.		UNKNOWN	5.117	320	J
4.		UNKNOWN ORGANIC ACID	11.805	68	J
5.		-Dodecatrien--ol, -trimethy	19.658	280	J
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
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27.					
28.					
29.					
30.					

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK3

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1218SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: M4045.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:12/18/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/20/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616049

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)Ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-Methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK3

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1218SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: M4045.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:12/18/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/20/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616050

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	830	U
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	19	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	330	U
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

SBLK3

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: BL1218SA

Sample wt/vol: 30.0 (g/mL) G Lab File ID: M4045.D

Level: (low/med) LOW Date Received: / /

% Moisture: 0 decanted: (Y/N) N Date Extracted:12/18/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/20/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

5616951

Number TICs found: 14

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		-Pentene, -dimethyl-	0.841	300	J
2.		UNKNOWN	0.979	250	J
3.	123-42-2	2-Pentanone, 4-hydroxy-4-met	1.157	7700	NJA
4.		Ethanol, -butoxy-	1.660	73	J
5.		UNKNOWN	1.719	110	J
6.		UNKNOWN	1.896	68	J
7.		UNKNOWN	1.995	110	J
8.		UNKNOWN	2.873	70	J
9.		UNKNOWN ORGANIC ACID	8.658	80	J
10.		UNKNOWN AMIDE	11.350	70	J
11.		UNKNOWN AMIDE	12.456	130	J
12.		UNKNOWN AMIDE	13.583	2300	J
13.		UNKNOWN AMIDE	15.588	660	J
14.	7683-64-9	Squalene	15.806	140	NJ
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
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30.					

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NAME OR WORK NO. 04606-056-026-0680
RECORDED OR OTHER 19.0
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APPENDIX C

ANALYTICAL RESULTS SUMMARY

TABLE C-1
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 MFGZ44 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 MFGZ45 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aluminum	2200	1400					
Antimony	12.2 UJv	11.5 UJv					
Arsenic	1.3 L	0.93 L					
Barium	21.4 L	15.4 L					
Beryllium	0.24 U	0.23 U					
Cadmium	0.49 U	0.46 U					
Calcium	406 L	368 L					
Chromium	5.6	3.3					
Cobalt	2.3 L	1.4 L					
Copper	2.7 LUC	1.6 LUC					
Cyanide	0.3 U	0.3 U					
Iron	4340	2880					
Lead	6 J	4 J					
Magnesium	333 L	247 L					
Manganese	112	67					
Mercury	0.05 U	0.05 U					
Nickel	3.4 L	3.4 L					
Potassium	373 L	190 L					
Selenium	0.24 U	0.23 U					
Silver	0.73 U	0.69 U					
Sodium	12.2 U	11.5 U					
Thallium	0.31 L	0.23 L					
Vanadium	6.5 LJv	4.5 LJv					
Zinc	7.6 J^	6.2 UC					

5616953

Detected Values are Shaded

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TABLE C-2
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 SS-04 MFGZ56 11/18/96 Normal 0.0'-0.5'	SS-05 SS-05 MFGZ57 11/18/96 Normal 0.0'-0.5'	SS-06 SS-06 MFGZ58 11/18/96 Normal 0.0'-0.5'	SS-07 SS-07 MFGZ59 11/19/96 Normal 0.0'-0.5'	SS-07 SS-08 MFGZ60 11/19/96 Duplicate 0.0'-0.5'	SS-11 SS-11 MFGZ63 11/19/96 Normal 0.0'-0.5'	SS-12 SS-12 MFGZ64 11/18/96 Normal 0.0'-0.5'
Aluminum	3430	4060	9090	7060	5720	2000	5350
Antimony	12.2 UJv	11.5 UJv	12.7 UJv	11.9 UJv	11.5 UJv	10.7 UJv	11.8 UJv
Arsenic	1.3 L	2.3	1.5 L	1.5 L	1.7 L	1 L	1.8 L
Barium	31.8 L	34.8 L	89	54.6	52.6	35.7 L	47.6
Beryllium	0.24 U	0.23 U	0.4 L	0.31 L	0.23 U	0.21 U	0.25 L
Cadmium	0.49 U	0.72 L	0.51 U	0.47 U	0.46 U	0.43 U	0.47 U
Calcium	947 L	1750	1240 L	2830	2810	767 L	4950 C-NA
Chromium	4.4	7.2	11	11.7	9.2	2.7	7.7
Cobalt	1.8 L	2.5 L	5.6 L	3.1 L	2.4 L	1.3 L	3 L
Copper	4.5 L	11.4	127	6.9	6.2	5.2 L	10.6
Cyanide	0.31 U	0.29 U	0.35 U	0.3 U	0.3 U	0.28 U	0.3 U
Iron	4570	6910	11200	8790	7570	2970	9570
Lead	116 J	369 J	55049 J	26.6 J	67.9 J	25.9 J	251 J
Magnesium	423 L	774 L	1050 L	963 L	902 L	338 L	957 L
Manganese	96.4	209	414	134	127	163	174
Mercury	0.05 U	0.18	0.06 U	0.05 U	0.05 U	0.05 U	0.08 L
Nickel	5.9 L	5.4 L	10.1	6.8 L	6.4 L	2.1 U	8.6 L
Potassium	480 L	680 L	1150 L	1070 L	778 L	377 L	795 L
Selenium	0.25 U	0.23 U	0.26 UJv	0.22 UJv	0.24 UJv	0.21 U	0.23 UJv
Silver	0.73 U	0.69 U	0.76 U	0.71 U	0.69 U	0.64 U	0.71 U
Sodium	17.8 L	14.2 L	2330 C-NA	23.1 L	18 L	10.7 U	70.6 L C-NA
Thallium	0.25 U	0.27 L	1.3 U	0.29 L	0.36 L	0.21 U	0.39 L
Vanadium	7.2 LJv	9.8 L	19.5	15.6	13.5	4 LJv	16.8
Zinc	36.3	132	25.7	26.2	24.1	50.7	70.1

5616054

Detected Values are Shaded

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TABLE C-2 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 MFGZ65 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aluminum	5110						
Antimony	12 UJv						
Arsenic	2 L						
Barium	46.2 L						
Beryllium	0.24 U						
Cadmium	0.48 U						
Calcium	4540						
Chromium	7						
Cobalt	3 L						
Copper	11.4						
Cyanide	0.3 U						
Iron	6330						
Lead	260 J						
Magnesium	1030 L						
Manganese	164						
Mercury	0.09 L						
Nickel	8.9 LJ						
Potassium	762 L						
Selenium	0.23 U						
Silver	0.72 U						
Sodium	56.1 L						
Thallium	0.35 L						
Vanadium	14.7						
Zinc	69.7						

5616955

Detected Values are Shaded

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TABLE C-3
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 MFGZ53 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 MFGZ54 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 MFGZ55 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aluminum	3630	5580	3550				
Antimony	11.6 UJv	11 UJv	12.5 UJv				
Arsenic	1.5 L	1.3 L	1.5 L				
Barium	46.6	58.2	31.8 L				
Beryllium	0.23 U	0.28 L	0.26 L				
Cadmium	0.68 L	0.44 U	0.5 U				
Calcium	1590	1510	516 L				
Chromium	5.7	8.2	6.7				
Cobalt	2.4 L	3.3 L	4.6 L				
Copper	5.2 L	5.3 L	4.4 L				
Cyanide	0.3 U	0.29 U	0.31 U				
Iron	4850	6340	7430				
Lead	26.3 J	19.5 J	6.6 J				
Magnesium	577 L	693 L	744 L				
Manganese	191	233	80.7				
Mercury	0.06 U	0.05 U	0.06 U				
Nickel	5.3 L	7.3 L	10.4				
Potassium	704 L	961 L	840 L				
Selenium	0.24 U	0.23 U	0.24 U				
Silver	0.7 U	0.66 U	0.75 U				
Sodium	11.6 U	20.5 L	17.7 L				
Thallium	0.26 L	0.23 U	0.39 L				
Vanadium	8.7 L	11.2	8 L				
Zinc	24.3	34.8	23.5				

5616956

Detected Values are Shaded

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TABLE C-4
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 MFGZ53 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 MFGZ54 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 MFGZ55 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aluminum	3630	5580	3550				
Antimony	11.6 UJv	11 UJv	12.5 UJv				
Arsenic	1.5 L	1.3 L	1.5 L				
Barium	46.6	58.2	31.8 L				
Beryllium	0.23 U	0.28 L	0.26 L				
Cadmium	0.68 L	0.44 U	0.5 U				
Calcium	1590	1510	516 L				
Chromium	5.7	8.2	6.7				
Cobalt	2.4 L	3.3 L	4.6 L				
Copper	5.2 L	5.3 L	4.4 L				
Cyanide	0.3 U	0.29 U	0.31 U				
Iron	4850	6340	7430				
Lead	26.3 J	19.5 J	6.6 J				
Magnesium	577 L	693 L	744 L				
Manganese	191	233	80.7				
Mercury	0.06 U	0.05 U	0.06 U				
Nickel	5.3 L	7.3 L	10.4				
Potassium	704 L	961 L	840 L				
Selenium	0.24 U	0.23 U	0.24 U				
Silver	0.7 U	0.66 U	0.75 U				
Sodium	11.6 U	20.5 L	17.7 L				
Thallium	0.26 L	0.23 U	0.39 L				
Vanadium	8.7 L	11.2	8 L				
Zinc	24.3	34.8	23.5				

5616957

Detected Values are Shaded

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TABLE C-5
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date	WS-01 WS-01 9611G675-001 11/20/96	WS-02 WS-02 9611G675-002 11/20/96	WS-03 WS-03 9611G675-003 11/20/96	WS-04 WS-04 9611G675-004 11/20/96	WS-05 WS-05 9611G675-005 11/20/96	WS-05 WS-06 9611G675-006 11/20/96	WS-07 WS-07 9611G675-007 11/20/96
Aluminum	1750	86	641	22100	1070	957	1840
Antimony	4 U	2.7 U	2.8 U	7.7	4 U	3.6 U	3 U
Arsenic	1.4	1.1	1.2	6.5	8.7	2.6	3.2
Barium	22.2	2.2	24	191	44.2	47.4	24.7
Beryllium	0.1	0.07 U	0.07 U	1.2	0.11	0.1	0.15
Cadmium	0.53 U	0.36 U	0.37 U	0.6 U	0.52 U	0.47 U	0.4 U
Calcium	1020	161	2060	9460 C-NA	4420	1510	432
Chromium	2.7	0.3	2	24.3	4.7	3.1	3.4
Cobalt	1.9	0.48 U	1.5	10.3	2.8	2.8	1.7
Copper	5.5	2.5	5.7	42.5	100	74.3	11
Cyanide	0.61 U	0.56 U	0.43 U	2	0.7 U	0.44 U	0.35 U
Iron	2330	548	2940	19800	8930	8370	6180
Lead	25.8	8.7	37.8	47000	3660	2260	14
Magnesium	278	32.4	263	5080	598	290	157
Manganese	68.4	10.4	249	701	86.4	36.7	43.6
Mercury	0.05 U	0.06 U	0.04 U	0.07 U	0.11	0.05 U	0.04 U
Nickel	7.8	1.2 U	4.1	20.9	11.6	8.8	4.7
Potassium	437	90.4 U	348	3300	293	314	238
Selenium	0.44 U	0.35 U	0.29 U	1 U	0.84	0.44	0.3 U
Silver	0.45 U	0.31 U	0.32 U	2	0.67	0.92	0.46 C-NA
Sodium	144 C-NA	124 C-NA	108 C-NA	289 C-NA	1510 C-NA	1450 C-NA	84 C-NA
Thallium	0.39 U	0.31 U	0.26 U	0.46 U	0.35 U	0.32 U	0.27 U
Vanadium	13.2	2.9	7.6	38.1	10.9	9.7	11
Zinc	33.6	7.6	27.2	127	66.4	51.7	41.8

5616058

Detected Values are Shaded

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TABLE C-5 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Metals Results (MG/KG)

Analyte / Station / Sample / Lab ID / Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aluminum	9720						
Antimony	4.7 U						
Arsenic	2.8						
Barium	129						
Beryllium	0.58						
Cadmium	0.7						
Calcium	3110						
Chromium	13.4						
Cobalt	5.9						
Copper	13.9						
Cyanide	0.95						
Iron	10800						
Lead	77.8						
Magnesium	999						
Manganese	938						
Mercury	0.06 U						
Nickel	17.4						
Potassium	1350						
Selenium	0.47						
Silver	0.9						
Sodium	115 C-NA						
Thallium	0.42 U						
Vanadium	26.3						
Zinc	160						

Detected Values are Shaded

5616059

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TABLE C-6
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene	400 U	390 U					
1,2-Dichlorobenzene	400 U	390 U					
1,3-Dichlorobenzene	400 U	390 U					
1,4-Dichlorobenzene	400 U	390 U					
2,2'-Oxybis(1-chloropropane)	400 U	390 U					
2,4,5-Trichlorophenol	1000 U	990 U					
2,4,6-Trichlorophenol	400 U	390 U					
2,4-Dichlorophenol	400 U	390 U					
2,4-Dimethylphenol	400 U	390 U					
2,4-Dinitrophenol	1000 U	990 U					
2,4-Dinitrotoluene	400 U	390 U					
2,6-Dinitrotoluene	400 U	390 U					
2-Chloronaphthalene	400 U	390 U					
2-Chlorophenol	400 U	390 U					
2-Methylnaphthalene	400 U	390 U					
2-Methylphenol	400 U	390 U					
2-Nitroaniline	1000 U	990 U					
2-Nitrophenol	400 U	390 U					
3,3'-Dichlorobenzidine	400 U	390 U					
3-Nitroaniline	1000 U	990 U					
4,6-Dinitro-2-methylphenol	1000 U	990 U					
4-Bromophenyl-phenylether	400 U	390 U					
4-Chloro-3-methylphenol	400 U	390 U					
4-Chloroaniline	400 U	390 U					
4-Chlorophenyl-phenylether	400 U	390 U				09099	

Detected Values are Shaded

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TABLE C-6 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4-Methylphenol	400 U	390 U					
4-Nitroaniline	1000 U	990 U					
4-Nitrophenol	1000 U	990 U					
Acenaphthene	400 U	390 U					
Acenaphthylene	400 U	390 U					
Anthracene	400 U	390 U					
Benzo(a)anthracene	400 U	390 U					
Benzo(a)pyrene	400 U	390 U					
Benzo(b)fluoranthene	400 U	390 U					
Benzo(g,h,i)perylene	400 U	390 U					
Benzo(k)fluoranthene	400 U	390 U					
bis(2-Chloroethoxy)methane	400 U	390 U					
bis(2-Chloroethyl)ether	400 U	390 U					
bis(2-Ethylhexyl)phthalate	400 U	390 U					
Butylbenzylphthalate	35 J	36 J					
Carbazole	400 U	390 U					
Chrysene	400 U	390 U					
Di-n-butylphthalate	400 U	390 U					
Di-n-octylphthalate	400 U	390 U					
Dibenz(a,h)anthracene	400 U	390 U					
Dibenzofuran	400 U	390 U					
Diethylphthalate	400 U	390 U					
Dimethylphthalate	400 U	390 U					
Fluoranthene	400 U	390 U					
Fluorene	400 U	390 U					

1969195

Detected Values are Shaded

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TABLE C-6 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Hexachlorobenzene	400 U	390 U					
Hexachlorobutadiene	400 U	390 U					
Hexachlorocyclopentadiene	400 U	390 U					
Hexachloroethane	400 U	390 U					
Indeno(1,2,3-cd)pyrene	400 U	390 U					
Isophorone	400 U	390 U					
N-Nitroso-di-n-propylamine	400 U	390 U					
N-Nitrosodiphenylamine	400 U	390 U					
Naphthalene	400 U	390 U					
Nitrobenzene	400 U	390 U					
Pentachlorophenol	1000 U	990 U					
Phenanthrene	400 U	390 U					
Phenol	400 U	390 U					
Pyrene	400 U	390 U					

2909195

Detected Values are Shaded

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TABLE C-7
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station	SED-03	SED-04	SED-05	SED-06	SED-06	SED-08	SED-09
	Sample	SED-03	SED-04	SED-05	SED-06	SED-07	SED-08	SED-09
	Lab ID	FFG04	FFG05	FFG06	FFG07	FFG08	FFG09	FFG10
	Date	11/18/96	11/18/96	11/19/96	11/18/96	11/18/96	11/19/96	11/19/96
	QC Type	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
	Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.0'	0.0'-0.5'	0.0'-0.5'
1,2,4-Trichlorobenzene		27 JC-BSQ	410 U	420 UJv	440 U	430 U	460 U	400 U
1,2-Dichlorobenzene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
1,3-Dichlorobenzene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
1,4-Dichlorobenzene		29 JC-BSQ	410 U	420 UJv	440 U	430 U	460 U	400 U
2,2'-Oxybis(1-chloropropane)		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2,4,5-Trichlorophenol		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
2,4,6-Trichlorophenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2,4-Dichlorophenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2,4-Dimethylphenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2,4-Dinitrophenol		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
2,4-Dinitrotoluene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2,6-Dinitrotoluene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2-Chloronaphthalene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2-Chlorophenol		42 JC-BSQ	410 UC-BSQ	420 UJv	440 U	430 U	460 U	400 U
2-Methylnaphthalene		420 U	60 JC-BSQ	420 UJv	440 U	430 U	460 U	400 U
2-Methylphenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
2-Nitroaniline		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
2-Nitrophenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
3,3'-Dichlorobenzidine		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
3-Nitroaniline		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
4,6-Dinitro-2-methylphenol		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
4-Bromophenyl-phenylether		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
4-Chloro-3-methylphenol		34 JC-BSQ	410 U	420 UJv	440 U	430 U	460 U	400 U
4-Chloroaniline		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
4-Chlorophenyl-phenylether		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U

5619063

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TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station	SED-03	SED-04	SED-05	SED-06	SED-06	SED-08	SED-09
	Sample	SED-03	SED-04	SED-05	SED-06	SED-07	SED-08	SED-09
	Lab ID	FFG04	FFG05	FFG06	FFG07	FFG08	FFG09	FFG10
	Date	11/18/96	11/18/96	11/19/96	11/18/96	11/18/96	11/19/96	11/19/96
	QC Type	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
	Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.0'	0.0'-0.5'	0.0'-0.5'
4-Methylphenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
4-Nitroaniline		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
4-Nitrophenol		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
Acenaphthene		32 JC-BSQ	22 JC-BSQ	420 UJv	440 U	430 U	460 U	400 U
Acenaphthylene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Anthracene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Benzo(a)anthracene		420 U	100 JC-BSQ	420 UJv	440 U	430 U	460 U	400 U
Benzo(a)pyrene		420 U	100 JC-BSQ	420 UJv	440 U	430 U	27 JC-BSQ	400 U
Benzo(b)fluoranthene		420 U	90 JC-BSQ	420 UJv	440 U	430 U	31 JC-BSQ	400 U
Benzo(g,h,i)perylene		420 U	410 U	420 UJv	440 U	430 U	460 UJv	400 U
Benzo(k)fluoranthene		420 U	84 JC-BSQ	420 UJv	440 U	430 U	31 JC-BSQ	400 U
bis(2-Chloroethoxy)methane		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
bis(2-Chloroethyl)ether		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
bis(2-Ethylhexyl)phthalate		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Butylbenzylphthalate		34 J	57 J	420 UJv	45 J	48 J	29 J	400 U
Carbazole		420 U	410 U	420 UJv	440 U	46 JC-BSQ	460 U	400 U
Chrysene		420 U	150 JC-BSQ	420 UJv	440 U	96 JC-BSQ	49 JC-BSQ	400 U
Di-n-butylphthalate		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Di-n-octylphthalate		420 U	410 U	420 UJv	440 U	430 U	460 UJv	400 U
Dibenz(a,h)anthracene		420 U	410 U	420 UJv	440 U	430 U	460 UJv	400 U
Dibenzofuran		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Diethylphthalate		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Dimethylphthalate		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Fluoranthene		420 U	130 JC-BSQ	420 UJv	440 U	240 JC-BSQ	460 U	400 U
Fluorene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U

Detected Values are Shaded

5161064

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TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SED-03 SED-03 FFG04 11/18/96 Normal 0.0'-0.5'	SED-04 SED-04 FFG05 11/18/96 Normal 0.0'-0.5'	SED-05 SED-05 FFG06 11/19/96 Normal 0.0'-0.5'	SED-06 SED-06 FFG07 11/18/96 Normal 0.0'-0.5'	SED-06 SED-07 FFG08 11/18/96 Duplicate 0.0'-0.0'	SED-08 SED-08 FFG09 11/19/96 Normal 0.0'-0.5'	SED-09 SED-09 FFG10 11/19/96 Normal 0.0'-0.5'
Hexachlorobenzene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Hexachlorobutadiene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Hexachlorocyclopentadiene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Hexachloroethane		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Indeno(1,2,3-cd)pyrene		420 U	410 U	420 UJv	440 U	430 U	460 UJv	400 U
Isophorone		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
N-Nitroso-di-n-propylamine		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
N-Nitrosodiphenylamine		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Naphthalene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Nitrobenzene		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Pentachlorophenol		1000 U	1000 U	1100 UJv	1100 U	1100 U	1200 U	1000 U
Phenanthrene		420 U	220 JC-BSQ	420 UJv	440 U	210 JC-BSQ	460 U	400 U
Phenol		420 U	410 U	420 UJv	440 U	430 U	460 U	400 U
Pyrene		420 U	180 JC-BSQ	420 UJv	440 U	170 JC-BSQ	49 JC-BSQ	400 U

Detected Values are Shaded

5909195

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TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene	370 U						
1,2-Dichlorobenzene	370 U						
1,3-Dichlorobenzene	370 U						
1,4-Dichlorobenzene	370 U						
2,2'-Oxybis(1-chloropropane)	370 U						
2,4,5-Trichlorophenol	920 U						
2,4,6-Trichlorophenol	370 U						
2,4-Dichlorophenol	370 U						
2,4-Dimethylphenol	370 U						
2,4-Dinitrophenol	920 U						
2,4-Dinitrotoluene	370 U						
2,6-Dinitrotoluene	370 U						
2-Chloronaphthalene	370 U						
2-Chlorophenol	370 U						
2-Methylnaphthalene	370 U						
2-Methylphenol	370 U						
2-Nitroaniline	920 U						
2-Nitrophenol	370 U						
3,3'-Dichlorobenzidine	370 U						
3-Nitroaniline	920 U						
4,6-Dinitro-2-methylphenol	920 U						
4-Bromophenyl-phenylether	370 U						
4-Chloro-3-methylphenol	370 U						
4-Chloroaniline	370 U						
4-Chlorophenyl-phenylether	370 U						

9909199

Detected Values are Shaded

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TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4-Methylphenol	370 U						
4-Nitroaniline	920 U						
4-Nitrophenol	920 U						
Acenaphthene	370 U						
Acenaphthylene	370 U						
Anthracene	370 U						
Benzo(a)anthracene	27 JC-BSQ						
Benzo(a)pyrene	20 JC-BSQ						
Benzo(b)fluoranthene	30 JC-BSQ						
Benzo(g,h,i)perylene	370 U						
Benzo(k)fluoranthene	370 U						
bis(2-Chloroethoxy)methane	370 U						
bis(2-Chloroethyl)ether	370 U						
bis(2-Ethylhexyl)phthalate	370 U						
Butylbenzylphthalate	370 U						
Carbazole	370 U						
Chrysene	54 JC-BSQ						
Di-n-butylphthalate	370 U						
Di-n-octylphthalate	370 U						
Dibenz(a,h)anthracene	370 U						
Dibenzofuran	370 U						
Diethylphthalate	370 U						
Dimethylphthalate	370 U						
Fluoranthene	22 JC-BSQ						
Fluorene	370 U						

2909195

Detected Values are Shaded

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TABLE C-7 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Hexachlorobenzene	370 U						
Hexachlorobutadiene	370 U						
Hexachlorocyclopentadiene	370 U						
Hexachloroethane	370 U						
Indeno(1,2,3-cd)pyrene	370 U						
Isophorone	370 U						
N-Nitroso-di-n-propylamine	370 U						
N-Nitrosodiphenylamine	370 U						
Naphthalene	370 U						
Nitrobenzene	370 U						
Pentachlorophenol	920 U						
Phenanthrene	22 JC-BSQ						
Phenol	370 U						
Pyrene	58 JC-BSQ						

Detected Values are Shaded

5616068

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TABLE C-8
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station Sample Lab ID Date QC Type Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene		410 U	410 U	380 U				
1,2-Dichlorobenzene		410 U	410 U	380 U				
1,3-Dichlorobenzene		410 U	410 U	380 U				
1,4-Dichlorobenzene		410 U	410 U	380 U				
2,2'-Oxybis(1-chloropropane)		410 U	410 U	380 U				
2,4,5-Trichlorophenol		1000 U	1000 U	960 U				
2,4,6-Trichlorophenol		410 U	410 U	380 U				
2,4-Dichlorophenol		410 U	410 U	380 U				
2,4-Dimethylphenol		410 U	410 U	380 U				
2,4-Dinitrophenol		1000 U	1000 U	960 U				
2,4-Dinitrotoluene		410 U	410 U	380 U				
2,6-Dinitrotoluene		410 U	410 U	380 U				
2-Chloronaphthalene		410 U	410 U	380 U				
2-Chlorophenol		410 U	410 U	380 U				
2-Methylnaphthalene		410 U	410 U	380 U				
2-Methylphenol		410 U	410 U	380 U				
2-Nitroaniline		1000 U	1000 U	960 U				
2-Nitrophenol		410 U	410 U	380 U				
3,3'-Dichlorobenzidine		410 U	410 U	380 U				
3-Nitroaniline		1000 U	1000 U	960 U				
4,6-Dinitro-2-methylphenol		1000 U	1000 U	960 U				
4-Bromophenyl-phenylether		410 U	410 U	380 U				
4-Chloro-3-methylphenol		410 U	410 U	380 U				
4-Chloroaniline		410 U	410 U	380 U				
4-Chlorophenyl-phenylether		410 U	410 U	380 U			5616969	

Detected Values are Shaded

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TABLE C-8 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4-Methylphenol		410 U	410 U	380 U				
4-Nitroaniline		1000 U	1000 U	960 U				
4-Nitrophenol		1000 U	1000 U	960 U				
Acenaphthene		410 U	410 U	380 U				
Acenaphthylene		410 U	410 U	380 U				
Anthracene		410 U	410 U	380 U				
Benzo(a)anthracene		410 U	36 JC-BSQ	380 U				
Benzo(a)pyrene		410 U	36 JC-BSQ	380 U				
Benzo(b)fluoranthene		410 U	42 JC-BSQ	380 U				
Benzo(g,h,i)perylene		410 U	410 U	380 U				
Benzo(k)fluoranthene		410 U	51 JC-BSQ	380 U				
bis(2-Chloroethoxy)methane		410 U	410 U	380 U				
bis(2-Chloroethyl)ether		410 U	410 U	380 U				
bis(2-Ethylhexyl)phthalate		410 U	410 U	380 U				
Butylbenzylphthalate		25 JC-BSQ	21 JC-BSQ	380 U				
Carbazole		410 U	410 U	380 U				
Chrysene		410 U	50 JC-BSQ	380 U				
Di-n-butylphthalate		410 U	23 JC-BSQ	380 U				
Di-n-octylphthalate		410 U	410 U	380 U				
Dibenz(a,h)anthracene		410 U	410 U	380 U				
Dibenzofuran		410 U	410 U	380 U				
Diethylphthalate		410 U	410 U	380 U				
Dimethylphthalate		410 U	410 U	380 U				
Fluoranthene		410 U	68 JC-BSQ	380 U				
Fluorene		410 U	410 U	380 U			561070	

Detected Values are Shaded

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TABLE C-8 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Hexachlorobenzene	410 U	410 U	380 U				
Hexachlorobutadiene	410 U	410 U	380 U				
Hexachlorocyclopentadiene	410 U	410 U	380 U				
Hexachloroethane	410 U	410 U	380 U				
Indeno(1,2,3-cd)pyrene	410 U	410 U	380 U				
Isophorone	410 U	410 U	380 U				
N-Nitroso-di-n-propylamine	410 U	410 U	380 U				
N-Nitrosodiphenylamine	410 U	410 U	380 U				
Naphthalene	410 U	410 U	380 U				
Nitrobenzene	410 U	410 U	380 U				
Pentachlorophenol	1000 U	1000 U	960 U				
Phenanthrene	410 U	34 JC-BSQ	380 U				
Phenol	410 U	410 U	380 U				
Pyrene	410 U	62 JC-BSQ	380 U				

561071

Detected Values are Shaded

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TABLE C-9
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 / SS-04 / FFG14 / 11/18/96 / Normal / 0.0'-0.5'	SS-05 / SS-05 / FFG15 / 11/18/96 / Normal / 0.0'-0.5'	SS-06 / SS-06 / FFG16 / 11/18/96 / Normal / 0.0'-0.5'	SS-07 / SS-07 / FFG17 / 11/19/96 / Normal / 0.0'-0.5'	SS-07 / SS-08 / FFG18 / 11/19/96 / Duplicate / 0.0'-0.5'	SS-11 / SS-11 / FFG21 / 11/19/96 / Normal / 0.0'-0.5'	SS-12 / SS-12 / FFG22 / 11/18/96 / Normal / 0.0'-0.5'
1,2,4-Trichlorobenzene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
1,2-Dichlorobenzene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
1,3-Dichlorobenzene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
1,4-Dichlorobenzene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2,2'-Oxybis(1-chloropropane)		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2,4,5-Trichlorophenol		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
2,4,6-Trichlorophenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2,4-Dichlorophenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2,4-Dimethylphenol		400 U	380 U	360 JC-BSQ	400 U	400 U	400 U	400 U
2,4-Dinitrophenol		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
2,4-Dinitrotoluene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2,6-Dinitrotoluene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2-Chloronaphthalene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2-Chlorophenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
2-Methylnaphthalene		400 U	200 JC-BSQ	430 U	400 U	400 U	400 U	400 U
2-Methylphenol		400 U	380 U	61 JC-BSQ	400 U	400 U	400 U	400 U
2-Nitroaniline		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
2-Nitrophenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
3,3'-Dichlorobenzidine		400 U	380 UJv	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
3-Nitroaniline		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
4,6-Dinitro-2-methylphenol		1000 U	950 UJv	1100 UJv	1000 U	1000 U	1000 U	1000 UJv
4-Bromophenyl-phenylether		400 U	380 UJv	430 UJv	400 U	400 U	400 U	400 UJv
4-Chloro-3-methylphenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
4-Chloroaniline		400 U	380 U	430 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-phenylether		400 U	380 U	430 U	400 U	400 U	400 U	400 U

5616072

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TABLE C-9 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 / SS-04 / FFG14 / 11/18/96 / Normal / 0.0'-0.5'	SS-05 / SS-05 / FFG15 / 11/18/96 / Normal / 0.0'-0.5'	SS-06 / SS-06 / FFG16 / 11/18/96 / Normal / 0.0'-0.5'	SS-07 / SS-07 / FFG17 / 11/19/96 / Normal / 0.0'-0.5'	SS-07 / SS-08 / FFG18 / 11/19/96 / Duplicate / 0.0'-0.5'	SS-11 / SS-11 / FFG21 / 11/19/96 / Normal / 0.0'-0.5'	SS-12 / SS-12 / FFG22 / 11/18/96 / Normal / 0.0'-0.5'
4-Methylphenol		400 U	380 U	94 JC-BSQ	400 U	400 U	400 U	400 U
4-Nitroaniline		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
4-Nitrophenol		1000 U	950 U	1100 U	1000 U	1000 U	1000 U	1000 U
Acenaphthene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Acenaphthylene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Anthracene		400 U	380 UJv	430 UJv	400 U	400 U	400 U	400 UJv
Benzo(a)anthracene		400 U	300 JC-BSQ	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Benzo(a)pyrene		400 U	250 JC-BSQ	150 JC-BSQ	400 UJv	400 UJv	400 UJv	400 UJv
Benzo(b)fluoranthene		400 U	230 JC-BSQ	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Benzo(g,h,i)perylene		400 U	440 J	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Benzo(k)fluoranthene		400 U	380 UJv	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
bis(2-Chloroethoxy)methane		400 U	380 U	430 U	400 U	400 U	400 U	400 U
bis(2-Chloroethyl)ether		400 U	380 U	430 U	400 U	400 U	400 U	400 U
bis(2-Ethylhexyl)phthalate		400 U	380 UJv	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Butylbenzylphthalate		400 U	380 UJv	100 JC-BSQ	53 J	45 J	35 J	400 UJv
Carbazole		400 U	380 UJv	430 UJv	400 U	400 U	400 U	400 UJv
Chrysene		400 U	690 J	100 J	41 J	26 J	22 J	400 UJv
Di-n-butylphthalate		400 U	380 UJv	430 UJv	400 U	400 U	30 J	400 UJv
Di-n-octylphthalate		400 U	380 UJv	27 JC-BSQ	400 UJv	400 UJv	400 UJv	400 UJv
Dibenz(a,h)anthracene		400 U	380 UJv	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Dibenzofuran		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Diethylphthalate		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Dimethylphthalate		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Fluoranthene		400 U	380 UJv	430 UJv	400 U	400 U	400 U	400 UJv
Fluorene		400 U	380 U	430 U	400 U	400 U	400 U	400 U

5616073

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TABLE C-9 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station	SS-04	SS-05	SS-06	SS-07	SS-07	SS-11	SS-12
	Sample	SS-04	SS-05	SS-06	SS-07	SS-08	SS-11	SS-12
	Lab ID	FFG14	FFG15	FFG16	FFG17	FFG18	FFG21	FFG22
	Date	11/18/96	11/18/96	11/18/96	11/19/96	11/19/96	11/19/96	11/18/96
	QC Type	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
	Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'
Hexachlorobenzene		400 U	380 UJv	430 UJv	400 U	400 U	400 U	400 UJv
Hexachlorobutadiene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Hexachlorocyclopentadiene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Hexachloroethane		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Indeno(1,2,3-cd)pyrene		400 U	380 UJv	430 UJv	400 UJv	400 UJv	400 UJv	400 UJv
Isophorone		400 U	380 U	430 U	400 U	400 U	400 U	400 U
N-Nitroso-di-n-propylamine		400 U	380 U	430 U	400 U	400 U	400 U	400 U
N-Nitrosodiphenylamine		400 U	380 UJv	430 UJv	400 U	400 U	400 UJv	400 UJv
Naphthalene		400 U	81 JC-BSQ	430 U	400 U	400 U	400 U	400 U
Nitrobenzene		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Pentachlorophenol		1000 U	950 UJv	1100 UJv	1000 U	1000 U	400 U	1000 UJv
Phenanthrene		400 U	790 J	430 UJv	400 U	400 U	400 U	400 UJv
Phenol		400 U	380 U	430 U	400 U	400 U	400 U	400 U
Pyrene		400 U	560 J	430 UJv	25 J	38 J	26 J	400 UJv

5616074

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TABLE C-9 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene	400 U						
1,2-Dichlorobenzene	400 U						
1,3-Dichlorobenzene	400 U						
1,4-Dichlorobenzene	400 U						
2,2'-Oxybis(1-chloropropane)	400 U						
2,4,5-Trichlorophenol	1000 U						
2,4,6-Trichlorophenol	400 U						
2,4-Dichlorophenol	400 U						
2,4-Dimethylphenol	400 U						
2,4-Dinitrophenol	1000 U						
2,4-Dinitrotoluene	400 U						
2,6-Dinitrotoluene	400 U						
2-Chloronaphthalene	400 U						
2-Chlorophenol	400 U						
2-Methylnaphthalene	400 U						
2-Methylphenol	400 U						
2-Nitroaniline	1000 U						
2-Nitrophenol	400 U						
3,3'-Dichlorobenzidine	400 UJv						
3-Nitroaniline	1000 U						
4,6-Dinitro-2-methylphenol	1000 U						
4-Bromophenyl-phenylether	400 U						
4-Chloro-3-methylphenol	400 U						
4-Chloroaniline	400 U						
4-Chlorophenyl-phenylether	400 U						

5616075

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TABLE C-9 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4-Methylphenol	400 U						
4-Nitroaniline	1000 U						
4-Nitrophenol	1000 U						
Acenaphthene	400 U						
Acenaphthylene	400 U						
Anthracene	400 U						
Benzo(a)anthracene	400 UJv						
Benzo(a)pyrene	54 J						
Benzo(b)fluoranthene	31 J						
Benzo(g,h,i)perylene	190 JC-BSQ						
Benzo(k)fluoranthene	26 J						
bis(2-Chloroethoxy)methane	400 U						
bis(2-Chloroethyl)ether	400 U						
bis(2-Ethylhexyl)phthalate	400 UJv						
Butylbenzylphthalate	59 J						
Carbazole	400 U						
Chrysene	82 J						
Di-n-butylphthalate	400 U						
Di-n-octylphthalate	400 UJv						
Dibenz(a,h)anthracene	26 JC-BSQ						
Dibenzofuran	400 U						
Diethylphthalate	400 U						
Dimethylphthalate	400 U						
Fluoranthene	400 U						
Fluorene	400 U						

Detected Values are Shaded

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TABLE C-9 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Hexachlorobenzene	400 U						
Hexachlorobutadiene	400 U						
Hexachlorocyclopentadiene	400 U						
Hexachloroethane	400 U						
Indeno(1,2,3-cd)pyrene	51 JC-BSQ						
Isophorone	400 U						
N-Nitroso-di-n-propylamine	400 U						
N-Nitrosodiphenylamine	400 U						
Naphthalene	400 U						
Nitrobenzene	400 U						
Pentachlorophenol	1000 U						
Phenanthrene	35 J						
Phenol	400 U						
Pyrene	94 J						

Detected Values are Shaded

2209195

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TABLE C-10
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station Sample Lab ID Date	WS-01 WS-01 9611G675-001 11/20/96	WS-02 WS-02 9611G675-002 11/20/96	WS-03 WS-03 9611G675-003 11/20/96	WS-04 WS-04 9611G675-004 11/20/96	WS-05 WS-05 9611G675-005 11/20/96	WS-05 WS-06 9611G675-006 11/20/96	WS-07 WS-07 9611G675-007 11/20/96
1,2,4-Trichlorobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
1,2-Dichlorobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
1,3-Dichlorobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
1,4-Dichlorobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2,4,5-Trichlorophenol		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
2,4,6-Trichlorophenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2,4-Dichlorophenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2,4-Dimethylphenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2,4-Dinitrophenol		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
2,4-Dinitrotoluene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2,6-Dinitrotoluene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2-Chloronaphthalene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2-Chlorophenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2-Methylnaphthalene		70000 U	64000 U	49000 U	3600 U	1.4E6	760000	8800 U
2-Methylphenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
2-Nitroaniline		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
2-Nitrophenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
3,3'-Dichlorobenzidine		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
3-Nitroaniline		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
4,6-Dinitro-2-methylphenol		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
4-Bromophenyl-phenylether		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
4-Chloro-3-methylphenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
4-Chloroaniline		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
4-Chlorophenyl-phenylether		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
4-Methylphenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
4-Nitroaniline		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
4-Nitrophenol		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U

5616078

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TABLE C-10 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date	WS-01 / WS-01 / 9611G675-001 / 11/20/96	WS-02 / WS-02 / 9611G675-002 / 11/20/96	WS-03 / WS-03 / 9611G675-003 / 11/20/96	WS-04 / WS-04 / 9611G675-004 / 11/20/96	WS-05 / WS-05 / 9611G675-005 / 11/20/96	WS-05 / WS-06 / 9611G675-006 / 11/20/96	WS-07 / WS-07 / 9611G675-007 / 11/20/96
Acenaphthene		70000 U	64000 U	49000 U	3600 U	66000 J C-BSQL	33000 J C-BSQL	8800 U
Acenaphthylene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Anthracene		70000 U	64000 U	49000 U	3600 U	70000 J C-BSQL	320000 U	8800 U
Benzo(a)anthracene		70000 U	23000 J C-BSQL	49000 U	3600 U	340000 U	320000 U	8800 U
Benzo(a)pyrene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Benzo(b)fluoranthene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Benzo(g,h,i)perylene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Benzo(k)fluoranthene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
bis(2-Chloroethoxy)methane		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
bis(2-Chloroethyl)ether		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
bis(2-Chloroisopropyl) Ether		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
bis(2-Ethylhexyl)phthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Butylbenzylphthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Carbazole		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Chrysene		70000 U	49000 J C-BSQL	49000 U	3600 U	340000 U	66000 J C-BSQL	1900 J C-BSQL
Di-n-butylphthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Di-n-octylphthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Dibenz(a,h)anthracene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Dibenzofuran		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Diethylphthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Dimethylphthalate		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Fluoranthene		70000 U	64000 U	49000 U	3600 U	340000 U	32000 J C-BSQL	8800 U
Fluorene		70000 U	7800 J C-BSQL	49000 U	3600 U	140000 J C-BSQL	80000 J C-BSQL	8800 U
Hexachlorobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Hexachlorobutadiene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Hexachlorocyclopentadiene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Hexachloroethane		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U

5616079

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TABLE C-10 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date	WS-01 / WS-01 / 9611G675-001 / 11/20/96	WS-02 / WS-02 / 9611G675-002 / 11/20/96	WS-03 / WS-03 / 9611G675-003 / 11/20/96	WS-04 / WS-04 / 9611G675-004 / 11/20/96	WS-05 / WS-05 / 9611G675-005 / 11/20/96	WS-05 / WS-06 / 9611G675-006 / 11/20/96	WS-07 / WS-07 / 9611G675-007 / 11/20/96
Indeno(1,2,3-cd)pyrene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Isophorone		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
N-Nitroso-di-n-propylamine		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
N-Nitrosodiphenylamine		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Naphthalene		70000 U	64000 U	49000 U	3600 U	300000 J C-BSQL	150000 J C-BSQL	8800 U
Nitrobenzene		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Pentachlorophenol		180000 U	160000 U	120000 U	9000 U	860000 U	790000 U	22000 U
Phenanthrene		70000 U	27000 J C-BSQL	49000 U	3600 U	520000	370000	8800 U
Phenol		70000 U	64000 U	49000 U	3600 U	340000 U	320000 U	8800 U
Pyrene		7800 J C-BSQL	230000	54000	3600 U	230000 J C-BSQL	260000 J C-BSQL	8800 U

5616080

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TABLE C-10 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,2,4-Trichlorobenzene	3100 U						
1,2-Dichlorobenzene	3100 U						
1,3-Dichlorobenzene	3100 U						
1,4-Dichlorobenzene	3100 U						
2,4,5-Trichlorophenol	7800 U						
2,4,6-Trichlorophenol	3100 U						
2,4-Dichlorophenol	3100 U						
2,4-Dimethylphenol	3100 U						
2,4-Dinitrophenol	7800 U						
2,4-Dinitrotoluene	3100 U						
2,6-Dinitrotoluene	3100 U						
2-Chloronaphthalene	3100 U						
2-Chlorophenol	3100 U						
2-Methylnaphthalene	520 J C-BSQL						
2-Methylphenol	3100 U						
2-Nitroaniline	7800 U						
2-Nitrophenol	3100 U						
3,3'-Dichlorobenzidine	3100 U						
3-Nitroaniline	7800 U						
4,6-Dinitro-2-methylphenol	7800 U						
4-Bromophenyl-phenylether	3100 U						
4-Chloro-3-methylphenol	3100 U						
4-Chloroaniline	3100 U						
4-Chlorophenyl-phenylether	3100 U						
4-Methylphenol	3100 U						
4-Nitroaniline	7800 U						
4-Nitrophenol	7800 U						

5160981

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TABLE C-10 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Acenaphthene	3100 U						
Acenaphthylene	3100 U						
Anthracene	3100 U						
Benzo(a)anthracene	3100 U						
Benzo(a)pyrene	3100 U						
Benzo(b)fluoranthene	3100 U						
Benzo(g,h,i)perylene	3100 U						
Benzo(k)fluoranthene	3100 U						
bis(2-Chloroethoxy)methane	3100 U						
bis(2-Chloroethyl)ether	3100 U						
bis(2-Chloroisopropyl) Ether	3100 U						
bis(2-Ethylhexyl)phthalate	3100 U						
Butylbenzylphthalate	3100 U						
Carbazole	3100 U						
Chrysene	1100 J C-BSQL						
Di-n-butylphthalate	3100 U						
Di-n-octylphthalate	3100 U						
Dibenz(a,h)anthracene	3100 U						
Dibenzofuran	3100 U						
Diethylphthalate	3100 U						
Dimethylphthalate	3100 U						
Fluoranthene	3100 U						
Fluorene	3100 U						
Hexachlorobenzene	3100 U						
Hexachlorobutadiene	3100 U						
Hexachlorocyclopentadiene	3100 U						
Hexachloroethane	3100 U						

5616082

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TABLE C-10 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Semi-Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Indeno(1,2,3-cd)pyrene	3100 U						
Isophorone	3100 U						
N-Nitroso-di-n-propylamine	3100 U						
N-Nitrosodiphenylamine	3100 U						
Naphthalene	3100 U						
Nitrobenzene	3100 U						
Pentachlorophenol	7800 U						
Phenanthrene	3100 U						
Phenol	3100 U						
Pyrene	3100 U						

5616083

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TABLE C-11
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aroclor-1016	40 U	39 U					
Aroclor-1221	82 U	80 U					
Aroclor-1232	40 U	39 U					
Aroclor-1242	40 U	39 U					
Aroclor-1248	40 U	39 U					
Aroclor-1254	40 U	39 U					
Aroclor-1260	40 U	39 U					

561684

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TABLE C-12
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SED-03 / SED-03 / FFG04 / 11/18/96 / Normal / 0.0'-0.5'	SED-04 / SED-04 / FFG05 / 11/18/96 / Normal / 0.0'-0.5'	SED-05 / SED-05 / FFG06 / 11/19/96 / Normal / 0.0'-0.5'	SED-06 / SED-06 / FFG07 / 11/18/96 / Normal / 0.0'-0.5'	SED-06 / SED-07 / FFG08 / 11/18/96 / Duplicate / 0.0'-0.0'	SED-08 / SED-08 / FFG09 / 11/19/96 / Normal / 0.0'-0.5'	SED-09 / SED-09 / FFG10 / 11/19/96 / Normal / 0.0'-0.5'
Aroclor-1016		42 U	41 U	42 U	44 U	43 U	46 U	40 U
Aroclor-1221		85 U	83 U	86 U	89 U	87 U	94 U	82 U
Aroclor-1232		42 U	41 U	42 U	44 U	43 U	46 U	40 U
Aroclor-1242		42 U	41 U	42 U	44 U	43 U	46 U	40 U
Aroclor-1248		42 U	41 U	42 U	44 U	43 U	46 U	40 U
Aroclor-1254		42 U	41 U	42 U	44 U	43 U	46 U	40 U
Aroclor-1260		42 U	41 U	42 U	44 U	43 U	46 U	40 U

5616085

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TABLE C-12 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aroclor-1016	37 U						
Aroclor-1221	74 U						
Aroclor-1232	37 U						
Aroclor-1242	37 U						
Aroclor-1248	37 U						
Aroclor-1254	37 U						
Aroclor-1260	37 U						

5616086

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TABLE C-13
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte / Station	SS-01	SS-02	SS-03	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Sample	SS-01	SS-02	SS-03				
Lab ID	FFG11	FFG12	FFG13				
Date	11/19/96	11/19/96	11/19/96				
QC Type	Normal	Normal	Normal				
Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'				
Aroclor-1016	41 U	41 U	38 U				
Aroclor-1221	83 U	84 U	78 U				
Aroclor-1232	41 U	41 U	38 U				
Aroclor-1242	41 U	41 U	38 U				
Aroclor-1248	41 U	41 U	38 U				
Aroclor-1254	41 U	41 U	38 U				
Aroclor-1260	41 U	41 U	38 U				

5809195

Detected Values are Shaded

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TABLE C-14
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 / SS-04 / FFG14 / 11/18/96 / Normal / 0.0'-0.5'	SS-05 / SS-05 / FFG15 / 11/18/96 / Normal / 0.0'-0.5'	SS-06 / SS-06 / FFG16 / 11/18/96 / Normal / 0.0'-0.5'	SS-07 / SS-07 / FFG17 / 11/19/96 / Normal / 0.0'-0.5'	SS-07 / SS-08 / FFG18 / 11/19/96 / Duplicate / 0.0'-0.5'	SS-11 / SS-11 / FFG21 / 11/19/96 / Normal / 0.0'-0.5'	SS-12 / SS-12 / FFG22 / 11/18/96 / Normal / 0.0'-0.5'
Aroclor-1016		40 U	38 U	43 U	40 U	40 U	40 U	40 U
Aroclor-1221		82 U	77 U	88 U	82 U	82 U	82 U	82 U
Aroclor-1232		40 U	38 U	43 U	40 U	40 U	40 U	40 U
Aroclor-1242		40 U	38 U	43 U	40 U	40 U	40 U	40 U
Aroclor-1248		40 U	38 U	43 U	40 U	40 U	40 U	40 U
Aroclor-1254		40 U	38 U	43 U	40 U	40 U	40 U	40 U
Aroclor-1260		40 U	38 U	43 U	40 U	40 U	40 U	40 U

5616088

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TABLE C-14 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Polychorinated Biphenyls Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Aroclor-1016	40 U						
Aroclor-1221	82 U						
Aroclor-1232	40 U						
Aroclor-1242	40 U						
Aroclor-1248	40 U						
Aroclor-1254	40 U						
Aroclor-1260	40 U						

5616089

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TABLE C-15
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Pesticides Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4,4'-DDD	4 U	3.9 U					
4,4'-DDE	4 U	3.9 U					
4,4'-DDT	4 U	3.9 U					
Aldrin	2.1 U	2 U					
alpha-BHC	2.1 U	2 U					
alpha-Chlordane	2.1 U	2 U					
beta-BHC	2.1 U	2 U					
delta-BHC	2.1 U	2 U					
Dieldrin	4 U	3.9 U					
Endosulfan I	2.1 U	2 U					
Endosulfan II	4 U	3.9 U					
Endosulfan sulfate	4 U	3.9 U					
Endrin	4 U	3.9 U					
Endrin aldehyde	4 U	3.9 U					
Endrin ketone	4 U	3.9 U					
gamma-BHC (lindane)	2.1 U	2 U					
gamma-Chlordane	2.1 U	2 U					
Heptachlor	2.1 U	2 U					
Heptachlor epoxide	2.1 U	2 U					
Methoxychlor	21 U	20 U					
Toxaphene	210 U	200 U					

5616090

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TABLE C-16
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Pesticides Results (UG/KG)

Analyte / Station	SED-03	SED-04	SED-05	SED-06	SED-06	SED-08	SED-09
Sample	SED-03	SED-04	SED-05	SED-06	SED-07	SED-08	SED-09
Lab ID	FFG04	FFG05	FFG06	FFG07	FFG08	FFG09	FFG10
Date	11/18/96	11/18/96	11/19/96	11/18/96	11/18/96	11/19/96	11/19/96
QC Type	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.0'	0.0'-0.5'	0.0'-0.5'
4,4'-DDD	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
4,4'-DDE	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
4,4'-DDT	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Aldrin	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
alpha-BHC	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
alpha-Chlordane	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
beta-BHC	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
delta-BHC	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
Dieldrin	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Endosulfan I	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
Endosulfan II	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Endosulfan sulfate	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Endrin	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Endrin aldehyde	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
Endrin ketone	4.2 U	4.1 U	4.2 U	4.4 U	4.3 U	4.6 U	4 U
gamma-BHC (lindane)	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
gamma-Chlordane	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
Heptachlor	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
Heptachlor epoxide	2.2 U	2.1 U	2.2 U	2.3 U	2.2 U	2.4 U	2.1 U
Methoxychlor	22 U	21 U	22 U	23 U	22 U	24 U	21 U
Toxaphene	220 U	210 U	220 U	230 U	220 U	240 U	210 U

160919S

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TABLE C-16 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Pesticides Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4,4'-DDD	3.7 U						
4,4'-DDE	3.7 U						
4,4'-DDT	3.7 U						
Aldrin	1.9 U						
alpha-BHC	1.9 U						
alpha-Chlordane	1.9 U						
beta-BHC	1.9 U						
delta-BHC	1.9 U						
Dieldrin	3.7 U						
Endosulfan I	1.9 U						
Endosulfan II	3.7 U						
Endosulfan sulfate	3.7 U						
Endrin	3.7 U						
Endrin aldehyde	3.7 U						
Endrin ketone	3.7 U						
gamma-BHC (lindane)	1.9 U						
gamma-Chlordane	1.9 U						
Heptachlor	1.9 U						
Heptachlor epoxide	1.9 U						
Methoxychlor	19 U						
Toxaphene	190 U						

561092
2609195

Detected Values are Shaded

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TABLE C-17
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Pesticides Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4,4'-DDD	4.1 U	4.1 U	3.8 U				
4,4'-DDE	4.1 U	4.1 U	3.8 U				
4,4'-DDT	4.1 U	4.1 U	3.8 U				
Aldrin	2.1 U	2.1 U	2 U				
alpha-BHC	2.1 U	2.1 U	2 U				
alpha-Chlordane	2.1 U	2.1 U	2 U				
beta-BHC	2.1 U	2.1 U	2 U				
delta-BHC	2.1 U	2.1 U	2 U				
Dieldrin	4.1 U	4.1 U	3.8 U				
Endosulfan I	2.1 U	2.1 U	2 U				
Endosulfan II	4.1 U	4.1 U	3.8 U				
Endosulfan sulfate	4.1 U	4.1 U	3.8 U				
Endrin	4.1 U	4.1 U	3.8 U				
Endrin aldehyde	4.1 U	4.7 U	3.8 U				
Endrin ketone	4.1 U	4.1 U	3.8 U				
gamma-BHC (lindane)	2.1 U	2.1 U	2 U				
gamma-Chlordane	2.1 U	2.1 U	2 U				
Heptachlor	2.1 U	2.1 U	2 U				
Heptachlor epoxide	2.1 U	2.1 U	2 U				
Methoxychlor	21 U	21 U	20 U				
Toxaphene	210 U	210 U	200 U				

561093

Detected Values are Shaded

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TABLE C-18
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Pesticides Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 / SS-04 / FFG14 / 11/18/96 / Normal / 0.0'-0.5'	SS-05 / SS-05 / FFG15 / 11/18/96 / Normal / 0.0'-0.5'	SS-06 / SS-06 / FFG16 / 11/18/96 / Normal / 0.0'-0.5'	SS-07 / SS-07 / FFG17 / 11/19/96 / Normal / 0.0'-0.5'	SS-07 / SS-08 / FFG18 / 11/19/96 / Duplicate / 0.0'-0.5'	SS-11 / SS-11 / FFG21 / 11/19/96 / Normal / 0.0'-0.5'	SS-12 / SS-12 / FFG22 / 11/18/96 / Normal / 0.0'-0.5'
4,4'-DDD		4 U	3.8 U	4.3 U	4 U	4 U	4 U	4 U
4,4'-DDE		4 U	3.8 U	4.3 U	4 U	4 U	4 U	4 U
4,4'-DDT		4 U	3.8 U	4.3 U	4 U	4 U	4 U	4 U
Aldrin		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
alpha-BHC		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
alpha-Chlordane		2.1 U	3.6 J C-NA	2.2 U	2.2 J C-NA	3.6 J C-NA	2.1 U	2.1 U
beta-BHC		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
delta-BHC		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
Dieldrin		4 U	3.8 U	4.3 U	4 U	4 U	4 U	4 U
Endosulfan I		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
Endosulfan II		4 U	7.9 C-NA	4.3 U	4 U	4 U	4 U	4 U
Endosulfan sulfate		4 U	10 UJ	4.3 U	4 U	4 U	4 U	4 U
Endrin		4 U	7.5 J C-NA	4.3 U	4 U	4 U	4 U	4 U
Endrin aldehyde		4 U	3.8 U	4.3 U	4 U	4 U	4 U	4 U
Endrin ketone		4 U	14 J C-NA	4.3 U	4 U	4 U	4 U	4 U
gamma-BHC (lindane)		2.1 U	2 U	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
gamma-Chlordane		2.1 U	5.7 C-NA	2.2 U	2.8 UJ	5.9 B C-NA	2.1 U	2.1 U
Heptachlor		2.5 C-NA	2 U C-NA	2.2 U	2.1 U	2.1 U	2.1 U	2.1 U
Heptachlor epoxide		2.1 U	2 U C-NA	2.2 U	2.1 C-NA	2.9 C-NA	2.1 U	2.1 U
Methoxychlor		21 U	20 U	22 U	21 U	21 U	21 U	21 U
Toxaphene		210 U	200 U	220 U	210 U	210 U	210 U	210 U

561609A

Detected Values are Shaded

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TABLE C-18 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Pesticides Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
4,4'-DDD	4 U						
4,4'-DDE	4 U						
4,4'-DDT	4 U						
Aldrin	2.1 U						
alpha-BHC	2.1 U						
alpha-Chlordane	2.1 U						
beta-BHC	2.1 U						
delta-BHC	2.1 U						
Dieldrin	4 U						
Endosulfan I	2.1 U						
Endosulfan II	4 U						
Endosulfan sulfate	5.6 UJ						
Endrin	4 U						
Endrin aldehyde	4 U						
Endrin ketone	4 U						
gamma-BHC (lindane)	2.1 U						
gamma-Chlordane	2.1 U						
Heptachlor	2.1 U						
Heptachlor epoxide	2.1 U						
Methoxychlor	21 U						
Toxaphene	210 U						

Detected Values are Shaded

561095

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TABLE C-19
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,1,1-Trichloroethane	12 U	12 U					
1,1,2,2-Tetrachloroethane	12 U	12 U					
1,1,2-Trichloroethane	12 U	12 U					
1,1-Dichloroethane	12 U	12 U					
1,1-Dichloroethene	12 U	12 U					
1,2-Dichloroethane	12 U	12 U					
1,2-Dichloroethene (total)	12 U	12 U					
1,2-Dichloropropane	12 U	12 U					
2-Butanone	12 U	12 U					
2-Hexanone	12 U	12 U					
4-Methyl-2-pentanone	12 U	12 U					
Acetone	12 U	12 U					
Benzene	12 U	12 U					
Bromodichloromethane	12 U	12 U					
Bromoform	12 U	12 U					
Bromomethane	12 U	12 U					
Carbon disulfide	12 U	12 U					
Carbon tetrachloride	12 U	12 U					
Chlorobenzene	12 U	12 U					
Chloroethane	12 U	12 U					
Chloroform	12 U	12 U					
Chloromethane	12 U	12 U					
cis-1,3-Dichloropropene	12 U	12 U					
Dibromochloromethane	12 U	12 U					
Ethylbenzene	12 U	12 U					

9609195

Detected Values are Shaded

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TABLE C-19 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Background Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SED-01 SED-01 FFG02 11/18/96 Normal 0.0'-0.5'	SED-02 SED-02 FFG03 11/18/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Methylene Chloride		1 JC-BSQ	1 JC-BSQ					
Styrene		12 U	12 U					
Tetrachloroethene		12 U	12 U					
Toluene		12 U	12 U					
trans-1,3-Dichloropropene		12 U	12 U					
Trichloroethene		12 U	12 U					
Vinyl Chloride		12 U	12 U					
Xylenes (total)		12 U	12 U					

Detected Values are Shaded

4609195

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TABLE C-20
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SED-03 SED-03 FFG04 11/18/96 Normal 0.0'-0.5'	SED-04 SED-04 FFG05 11/18/96 Normal 0.0'-0.5'	SED-05 SED-05 FFG06 11/19/96 Normal 0.0'-0.5'	SED-06 SED-06 FFG07 11/18/96 Normal 0.0'-0.5'	SED-06 SED-07 FFG08 11/18/96 Duplicate 0.0'-0.0'	SED-08 SED-08 FFG09 11/19/96 Normal 0.0'-0.5'	SED-09 SED-09 FFG10 11/19/96 Normal 0.0'-0.5'
1,1,1-Trichloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,1,2,2-Tetrachloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,1,2-Trichloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,1-Dichloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,1-Dichloroethene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloroethene (total)		13 U	12 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloropropane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
2-Butanone		13 U	12 U	13 U	13 U	13 U	14 U	12 U
2-Hexanone		13 U	12 U	13 U	13 U	13 U	14 U	12 U
4-Methyl-2-pentanone		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Acetone		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Benzene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Bromodichloromethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Bromoform		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Bromomethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Carbon disulfide		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Carbon tetrachloride		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Chlorobenzene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Chloroethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Chloroform		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Chloromethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
cis-1,3-Dichloropropene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Dibromochloromethane		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Ethylbenzene		13 U	12 U	13 U	13 U	13 U	14 U	12 U

5616098

Detected Values are Shaded

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TABLE C-20 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SED-03 / SED-03 / FFG04 / 11/18/96 / Normal / 0.0'-0.5'	SED-04 / SED-04 / FFG05 / 11/18/96 / Normal / 0.0'-0.5'	SED-05 / SED-05 / FFG06 / 11/19/96 / Normal / 0.0'-0.5'	SED-06 / SED-06 / FFG07 / 11/18/96 / Normal / 0.0'-0.5'	SED-06 / SED-07 / FFG08 / 11/18/96 / Duplicate / 0.0'-0.0'	SED-08 / SED-08 / FFG09 / 11/19/96 / Normal / 0.0'-0.5'	SED-09 / SED-09 / FFG10 / 11/19/96 / Normal / 0.0'-0.5'
Methylene Chloride		2 JC-BSQ	2 JC-BSQ	13 U	13 U	2 JC-BSQ	5 JC-BSQ	12 U
Styrene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Tetrachloroethene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Toluene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
trans-1,3-Dichloropropene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Trichloroethene		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Vinyl Chloride		13 U	12 U	13 U	13 U	13 U	14 U	12 U
Xylenes (total)		13 U	12 U	13 U	13 U	13 U	14 U	12 U

Detected Values are Shaded

5616099

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TABLE C-20 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,1,1-Trichloroethane	11 U						
1,1,2,2-Tetrachloroethane	11 U						
1,1,2-Trichloroethane	11 U						
1,1-Dichloroethane	11 U						
1,1-Dichloroethene	11 U						
1,2-Dichloroethane	11 U						
1,2-Dichloroethene (total)	11 U						
1,2-Dichloropropane	11 U						
2-Butanone	11 U						
2-Hexanone	11 U						
4-Methyl-2-pentanone	11 U						
Acetone	11 U						
Benzene	11 U						
Bromodichloromethane	11 U						
Bromoform	11 U						
Bromomethane	11 U						
Carbon disulfide	11 U						
Carbon tetrachloride	11 U						
Chlorobenzene	11 U						
Chloroethane	11 U						
Chloroform	11 U						
Chloromethane	11 U						
cis-1,3-Dichloropropene	11 U						
Dibromochloromethane	11 U						
Ethylbenzene	11 U						

Detected Values are Shaded

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TABLE C-20 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Sediment Characterization Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SED-10 SED-10 FFG24 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Methylene Chloride	11 U						
Styrene	11 U						
Tetrachloroethene	11 U						
Toluene	11 U						
trans-1,3-Dichloropropene	11 U						
Trichloroethene	11 U						
Vinyl Chloride	11 U						
Xylenes (total)	11 U						

561610195

Detected Values are Shaded

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TABLE C-21
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,1,1-Trichloroethane	12 U	12 U	12 U				
1,1,2,2-Tetrachloroethane	12 UJv	12 U	12 UJv				
1,1,2-Trichloroethane	12 U	12 U	12 U				
1,1-Dichloroethane	12 U	12 U	12 UJv				
1,1-Dichloroethene	12 U	12 U	12 UJv				
1,2-Dichloroethane	12 U	12 U	12 UJv				
1,2-Dichloroethene (total)	12 U	12 U	12 UJv				
1,2-Dichloropropane	12 U	12 U	12 U				
2-Butanone	12 U	12 U	12 UJv				
2-Hexanone	12 UJv	12 U	12 UJv				
4-Methyl-2-pentanone	12 UJv	12 U	12 UJv				
Acetone	12 U	12 U	12 UJv				
Benzene	12 U	12 U	12 U				
Bromodichloromethane	12 U	12 U	12 U				
Bromoform	12 U	12 U	12 U				
Bromomethane	12 U	12 U	12 UJv				
Carbon disulfide	12 U	12 U	12 UJv				
Carbon tetrachloride	12 U	12 U	12 U				
Chlorobenzene	12 UJv	12 U	12 UJv				
Chloroethane	12 U	12 U	12 UJv				
Chloroform	12 U	12 U	12 UJv				
Chloromethane	12 U	12 U	12 UJv				
cis-1,3-Dichloropropene	12 U	12 U	12 U				
Dibromochloromethane	12 U	12 U	12 U				
Ethylbenzene	12 UJv	12 U	12 UJv				

Detected Values are Shaded

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TABLE C-21 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Background Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-01 SS-01 FFG11 11/19/96 Normal 0.0'-0.5'	SS-02 SS-02 FFG12 11/19/96 Normal 0.0'-0.5'	SS-03 SS-03 FFG13 11/19/96 Normal 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Methylene Chloride	12 U	12 U	28 J				
Styrene	12 UJv	12 U	12 UJv				
Tetrachloroethene	12 UJv	12 U	12 UJv				
Toluene	12 UJv	12 U	12 UJv				
trans-1,3-Dichloropropene	12 U	12 U	12 U				
Trichloroethene	12 U	12 U	12 U				
Vinyl Chloride	12 U	12 U	12 UJv				
Xylenes (total)	12 UJv	12 U	12 UJv				

Detected Values are Shaded

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TABLE C-22
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date / QC Type / Depth	SS-04 / SS-04 / FFG14 / 11/18/96 / Normal / 0.0'-0.5'	SS-05 / SS-05 / FFG15 / 11/18/96 / Normal / 0.0'-0.5'	SS-06 / SS-06 / FFG16 / 11/18/96 / Normal / 0.0'-0.5'	SS-07 / SS-07 / FFG17 / 11/19/96 / Normal / 0.0'-0.5'	SS-07 / SS-08 / FFG18 / 11/19/96 / Duplicate / 0.0'-0.5'	SS-11 / SS-11 / FFG21 / 11/19/96 / Normal / 0.0'-0.5'	SS-12 / SS-12 / FFG22 / 11/18/96 / Normal / 0.0'-0.5'
1,1,1-Trichloroethane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
1,1,2,2-Tetrachloroethane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
1,1,2-Trichloroethane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
1,1-Dichloroethane		12 U	11 U	13 U	12 U	12 U	12 U	12 U
1,1-Dichloroethene		12 U	11 U	13 U	12 U	12 U	12 U	12 U
1,2-Dichloroethane		12 U	11 U	13 U	12 U	12 U	12 U	12 U
1,2-Dichloroethene (total)		12 U	11 U	13 U	12 U	12 U	12 U	12 U
1,2-Dichloropropane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
2-Butanone		12 U	11 U	13 U	12 U	12 U	12 U	12 U
2-Hexanone		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
4-Methyl-2-pentanone		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
Acetone		12 U	11 U	13 U	48 J	12 UJ	12 U	12 U
Benzene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Bromodichloromethane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Bromoform		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Bromomethane		12 U	11 U	13 U	12 U	12 U	12 U	12 U
Carbon disulfide		12 U	11 U	13 U	12 U	12 U	12 U	12 U
Carbon tetrachloride		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Chlorobenzene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
Chloroethane		12 U	11 U	13 U	12 U	12 U	12 U	12 U
Chloroform		12 U	11 U	13 U	12 U	12 U	12 U	12 U
Chloromethane		12 U	11 U	13 U	12 U	12 U	12 U	12 U
cis-1,3-Dichloropropene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Dibromochloromethane		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Ethylbenzene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv

Detected Values are Shaded

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TABLE C-22 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station	SS-04	SS-05	SS-06	SS-07	SS-07	SS-11	SS-12
	Sample	SS-04	SS-05	SS-06	SS-07	SS-08	SS-11	SS-12
	Lab ID	FFG14	FFG15	FFG16	FFG17	FFG18	FFG21	FFG22
	Date	11/18/96	11/18/96	11/18/96	11/19/96	11/19/96	11/19/96	11/18/96
	QC Type	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
	Depth	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'	0.0'-0.5'
Methylene Chloride		12 U	2 JC-BSQ	13 U	23 J	12 UJ	12 U	5
Styrene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
Tetrachloroethene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
Toluene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv
trans-1,3-Dichloropropene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Trichloroethene		12 U	11 UJv	13 U	12 U	12 U	12 U	12 U
Vinyl Chloride		12 U	11 U	13 U	12 U	12 U	12 U	12 U
Xylenes (total)		12 U	11 UJv	13 U	12 U	12 U	12 U	12 UJv

5616105

Detected Values are Shaded

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TABLE C-22 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,1,1-Trichloroethane	12 U						
1,1,2,2-Tetrachloroethane	12 U						
1,1,2-Trichloroethane	12 U						
1,1-Dichloroethane	12 U						
1,1-Dichloroethene	12 U						
1,2-Dichloroethane	12 U						
1,2-Dichloroethene (total)	12 U						
1,2-Dichloropropane	12 U						
2-Butanone	12 U						
2-Hexanone	12 U						
4-Methyl-2-pentanone	12 U						
Acetone	12 U						
Benzene	12 U						
Bromodichloromethane	12 U						
Bromoform	12 U						
Bromomethane	12 U						
Carbon disulfide	12 U						
Carbon tetrachloride	12 U						
Chlorobenzene	12 U						
Chloroethane	12 U						
Chloroform	12 U						
Chloromethane	12 U						
cis-1,3-Dichloropropene	12 U						
Dibromochloromethane	12 U						
Ethylbenzene	12 U						

Detected Values are Shaded

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561619S 90

TABLE C-22 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte / Station / Sample / Lab ID / Date / QC Type / Depth	SS-12 SS-13 FFG23 11/18/96 Duplicate 0.0'-0.5'	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Methylene Chloride	12 U						
Styrene	12 U						
Tetrachloroethene	12 U						
Toluene	12 U						
trans-1,3-Dichloropropene	12 U						
Trichloroethene	12 U						
Vinyl Chloride	12 U						
Xylenes (total)	12 U						

5616107

Detected Values are Shaded

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TABLE C-23
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date	WS-01 / WS-01 / 9611G675-001 / 11/20/96	WS-02 / WS-02 / 9611G675-002 / 11/20/96	WS-03 / WS-03 / 9611G675-003 / 11/20/96	WS-04 / WS-04 / 9611G675-004 / 11/20/96	WS-05 / WS-05 / 9611G675-005 / 11/20/96	WS-05 / WS-06 / 9611G675-006 / 11/20/96	WS-07 / WS-07 / 9611G675-007 / 11/20/96
1,1,1-Trichloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,1,2,2-Tetrachloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,1,2-Trichloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,1-Dichloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,1-Dichloroethene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,2-Dichloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,2-Dichloroethene (total)		140 U	130 U	100 U	19 U	140 U	130 U	11 U
1,2-Dichloropropane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
2-Butanone		140 U	130 U	100 U	19 U	140 U	130 U	11 U
2-Hexanone		140 U	130 U	100 U	19 U	140 U	130 U	11 U
4-Methyl-2-pentanone		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Acetone		140 U	130 U	100 U	19 U	2200	1000	11 U
Benzene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Bromodichloromethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Bromoform		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Bromomethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Carbon disulfide		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Carbon tetrachloride		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Chlorobenzene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Chloroethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Chloroform		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Chloromethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
cis-1,3-Dichloropropene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Dibromochloromethane		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Ethylbenzene		140 U	63 J C-BSQL	100 U	19 U	90 J C-BSQL	110 J C-BSQL	11 U
Methylene Chloride		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Styrene		140 U	130 U	100 U	19 U	140 U	130 U	11 U

5616408

Detected Values are Shaded

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TABLE C-23 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station / Sample / Lab ID / Date	WS-01 / WS-01 / 9611G675-001 / 11/20/96	WS-02 / WS-02 / 9611G675-002 / 11/20/96	WS-03 / WS-03 / 9611G675-003 / 11/20/96	WS-04 / WS-04 / 9611G675-004 / 11/20/96	WS-05 / WS-05 / 9611G675-005 / 11/20/96	WS-05 / WS-06 / 9611G675-006 / 11/20/96	WS-07 / WS-07 / 9611G675-007 / 11/20/96
Tetrachloroethene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Toluene		140 U	270	100 U	19 U	45 J C-BSQL	64 J C-BSQL	11 U
trans-1,3-Dichloropropene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Trichloroethene		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Vinyl Chloride		140 U	130 U	100 U	19 U	140 U	130 U	11 U
Xylenes (total)		140 U	280	100 U	19 U	380	450	11 U

5616109

Detected Values are Shaded

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TABLE C-23 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station Sample Lab ID Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
1,1,1-Trichloroethane		19 U						
1,1,2,2-Tetrachloroethane		19 U						
1,1,2-Trichloroethane		19 U						
1,1-Dichloroethane		19 U						
1,1-Dichloroethene		19 U						
1,2-Dichloroethane		19 U						
1,2-Dichloroethene (total)		19 U						
1,2-Dichloropropane		19 U						
2-Butanone		19 U						
2-Hexanone		19 U						
4-Methyl-2-pentanone		19 U						
Acetone		19 U						
Benzene		19 U						
Bromodichloromethane		19 U						
Bromoform		19 U						
Bromomethane		19 U						
Carbon disulfide		19 U						
Carbon tetrachloride		19 U						
Chlorobenzene		19 U						
Chloroethane		19 U						
Chloroform		19 U						
Chloromethane		19 U						
cis-1,3-Dichloropropene		19 U						
Dibromochloromethane		19 U						
Ethylbenzene		19 U						
Methylene Chloride		19 U						
Styrene		19 U						

Detected Values are Shaded

5619195

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TABLE C-23 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Volatile Organics Results (UG/KG)

Analyte	Station Sample Lab ID Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Tetrachloroethene		19 U						
Toluene		19 U						
trans-1,3-Dichloropropene		19 U						
Trichloroethene		19 U						
Vinyl Chloride		19 U						
Xylenes (total)		19 U						

561911

Detected Values are Shaded

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TABLE C-24
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Total Petroleum Hydrocarbons Results (MG/KG)

Analyte	Station / Sample / Lab ID / Date	WS-01 / WS-01 / 9611G675-001 / 11/20/96	WS-02 / WS-02 / 9611G675-002 / 11/20/96	WS-03 / WS-03 / 9611G675-003 / 11/20/96	WS-04 / WS-04 / 9611G675-004 / 11/20/96	WS-05 / WS-05 / 9611G675-005 / 11/20/96	WS-05 / WS-06 / 9611G675-006 / 11/20/96	WS-07 / WS-07 / 9611G675-007 / 11/20/96
Total Petroleum Hydrocarbons		427000	494000	293000	1370	875000	378000	85700

561612

Detected Values are Shaded

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TABLE C-24 (Continued)
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Soil Characterization Sampling Total Petroleum Hydrocarbons Results (MG/KG)

Analyte	Station Sample Lab ID Date	WS-08 WS-08 9611G675-008 11/20/96	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose	Left Blank On Purpose
Total Petroleum Hydrocarbons		23200						

5616113

Detected Values are Shaded

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MSD

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MSD

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) Y

5961114

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	10	
76-44-8	Heptachlor	12	
309-00-2	Aldrin	9.4	
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	✓ 23	
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	26	
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	22	
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MS

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10128.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8

561615

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1500	
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	1700	
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	1200	
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	1600	
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	✓1400	
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	1800	
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	1200	

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MS

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MS

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10128.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted:11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8

5616116

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	1900	
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	1400	
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	2200	
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	1300	
85-68-7	Butylbenzylphthalate	34	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MSD

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MSD

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10129.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8

5616117

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1600	
111-44-4	bis(2-Chloroethyl)Ether	400	U
95-57-8	2-Chlorophenol	1800	
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	1200	
95-50-1	1,2-Dichlorobenzene	400	U
95-48-7	2-Methylphenol	400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	400	U
106-44-5	4-Methylphenol	400	U
621-64-7	N-Nitroso-di-n-propylamine	1700	
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
88-75-5	2-Nitrophenol	400	U
105-67-9	2,4-Dimethylphenol	400	U
111-91-1	bis(2-Chloroethoxy)methane	400	U
120-83-2	2,4-Dichlorophenol	400	U
120-82-1	1,2,4-Trichlorobenzene	1400	
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
87-68-3	Hexachlorobutadiene	400	U
59-50-7	4-Chloro-3-Methylphenol	2000	
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
88-06-2	2,4,6-Trichlorophenol	400	U
95-95-4	2,4,5-Trichlorophenol	1000	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	1000	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	1000	U
83-32-9	Acenaphthene	1200	

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MSD

ab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MSD

Sample wt/vol: 30.0 (g/mL) G Lab File ID: P10129.D

Level: (low/med) LOW Date Received: 11/19/96

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/19/96

Concentrated Extract Volume: 500(uL) Date Analyzed: 12/02/96

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8

5616118

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1000	U
100-02-7	4-Nitrophenol	2100	
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	1600	
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	1000	U
534-52-1	4,6-Dinitro-2-methylphenol	1000	U
86-30-6	N-Nitrosodiphenylamine (1)	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
87-86-5	Pentachlorophenol	2400	
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U
129-00-0	Pyrene	1400	
85-68-7	Butylbenzylphthalate	40	J
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenz(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

(1) - Cannot be separated from Diphenylamine

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) Y

5616119

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG03

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) Y

561620

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.9	U
72-55-9	4,4'-DDE	3.9	U
72-20-8	Endrin	3.9	U
33213-65-9	Endosulfan II	3.9	U
72-54-8	4,4'-DDD	3.9	U
1031-07-8	Endosulfan sulfate	3.9	U
50-29-3	4,4'-DDT	3.9	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	3.9	U
7421-93-4	Endrin aldehyde	3.9	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	39	U
11104-28-2	Aroclor-1221	80	U
11141-16-5	Aroclor-1232	39	U
53469-21-9	Aroclor-1242	39	U
12672-29-6	Aroclor-1248	39	U
11097-69-1	Aroclor-1254	39	U
11096-82-5	Aroclor-1260	39	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG17

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

5616121

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.2	P
5103-74-2	gamma-Chlordane	2.8	P
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG16

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 24 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.4 Sulfur Cleanup: (Y/N) N

5616122

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	88	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	43	U
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	43	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG15

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

5616123

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.8	U
72-55-9	4,4'-DDE	3.8	U
72-20-8	Endrin	7.5	P
33213-65-9	Endosulfan II	7.9	
72-54-8	4,4'-DDD	3.8	U
1031-07-8	Endosulfan sulfate	10	P
50-29-3	4,4'-DDT	3.8	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	14	P
7421-93-4	Endrin aldehyde	✓3.8	U
5103-71-9	alpha-Chlordane	✓3.6	P
5103-74-2	gamma-Chlordane	✓5.7	
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	77	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG14

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.07

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

5616124

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.5	
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG13

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.06

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 14 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

5616125

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.8	U
72-55-9	4,4'-DDE	3.8	U
72-20-8	Endrin	3.8	U
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	3.8	U
1031-07-8	Endosulfan sulfate	3.8	U
50-29-3	4,4'-DDT	3.8	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	3.8	U
7421-93-4	Endrin aldehyde	3.8	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	78	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG12

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 20 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

5616126

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.7	
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	84	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG11

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.04

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 19 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

5616127

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG10

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.03

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

5616128

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG09

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.02

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 29 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

5616129

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.4	U
319-85-7	beta-BHC	2.4	U
319-86-8	delta-BHC	2.4	U
58-89-9	gamma-BHC (Lindane)	2.4	U
76-44-8	Heptachlor	2.4	U
309-00-2	Aldrin	2.4	U
1024-57-3	Heptachlor epoxide	2.4	U
959-98-8	Endosulfan I	2.4	U
60-57-1	Dieldrin	4.6	U
72-55-9	4,4'-DDE	4.6	U
72-20-8	Endrin	4.6	U
33213-65-9	Endosulfan II	4.6	U
72-54-8	4,4'-DDD	4.6	U
1031-07-8	Endosulfan sulfate	4.6	U
50-29-3	4,4'-DDT	4.6	U
72-43-5	Methoxychlor	24	U
53494-70-5	Endrin ketone	4.6	U
7421-93-4	Endrin aldehyde	4.6	U
5103-71-9	alpha-Chlordane	2.4	U
5103-74-2	gamma-Chlordane	2.4	U
8001-35-2	Toxaphene	240	U
12674-11-2	Aroclor-1016	46	U
11104-28-2	Aroclor-1221	94	U
11141-16-5	Aroclor-1232	46	U
53469-21-9	Aroclor-1242	46	U
12672-29-6	Aroclor-1248	46	U
11097-69-1	Aroclor-1254	46	U
11096-82-5	Aroclor-1260	46	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG08

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.06

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 23 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) Y

5616130

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	87	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	43	U
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	43	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG07

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 25 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) Y

5616131

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.4	U
72-55-9	4,4'-DDE	4.4	U
72-20-8	Endrin	4.4	U
33213-65-9	Endosulfan II	4.4	U
72-54-8	4,4'-DDD	4.4	U
1031-07-8	Endosulfan sulfate	4.4	U
50-29-3	4,4'-DDT	4.4	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.4	U
7421-93-4	Endrin aldehyde	4.4	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor-1016	44	U
11104-28-2	Aroclor-1221	89	U
11141-16-5	Aroclor-1232	44	U
53469-21-9	Aroclor-1242	44	U
12672-29-6	Aroclor-1248	44	U
11097-69-1	Aroclor-1254	44	U
11096-82-5	Aroclor-1260	44	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG06

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.01

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 22 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

5616132

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.2	U
72-55-9	4,4'-DDE	4.2	U
72-20-8	Endrin	4.2	U
33213-65-9	Endosulfan II	4.2	U
72-54-8	4,4'-DDD	4.2	U
1031-07-8	Endosulfan sulfate	4.2	U
50-29-3	4,4'-DDT	4.2	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.2	U
7421-93-4	Endrin aldehyde	4.2	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	42	U
11104-28-2	Aroclor-1221	86	U
11141-16-5	Aroclor-1232	42	U
53469-21-9	Aroclor-1242	42	U
12672-29-6	Aroclor-1248	42	U
11097-69-1	Aroclor-1254	42	U
11096-82-5	Aroclor-1260	42	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG05

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.04

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 19 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.4 Sulfur Cleanup: (Y/N) Y

5616133

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1	U
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	4.1	U
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	4.1	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG04

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.03

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 21 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.3 Sulfur Cleanup: (Y/N) Y

5616134

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.2	U
72-55-9	4,4'-DDE	4.2	U
72-20-8	Endrin	4.2	U
33213-65-9	Endosulfan II	4.2	U
72-54-8	4,4'-DDD	4.2	U
1031-07-8	Endosulfan sulfate	4.2	U
50-29-3	4,4'-DDT	4.2	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.2	U
7421-93-4	Endrin aldehyde	4.2	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	42	U
11104-28-2	Aroclor-1221	85	U
11141-16-5	Aroclor-1232	42	U
53469-21-9	Aroclor-1242	42	U
12672-29-6	Aroclor-1248	42	U
11097-69-1	Aroclor-1254	42	U
11096-82-5	Aroclor-1260	42	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG23

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.11

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.6 Sulfur Cleanup: (Y/N) N

561135

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	5.6	P
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG22

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.10

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.8 Sulfur Cleanup: (Y/N) N

5616136

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG21

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.09

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

5616137

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG18

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27683.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/19/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

5616138

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.9	
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	3.6	P
5103-74-2	gamma-Chlordane	5.9	
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PBLKSB

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: PBLKSB

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/20/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

5616139

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.3	U
72-55-9	4,4'-DDE	3.3	U
72-20-8	Endrin	3.3	U
33213-65-9	Endosulfan II	3.3	U
72-54-8	4,4'-DDD	3.3	U
1031-07-8	Endosulfan sulfate	3.3	U
50-29-3	4,4'-DDT	3.3	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.3	U
7421-93-4	Endrin aldehyde	3.3	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PBLKSC

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: PBLKSC

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/05/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

5616140

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.3	U
72-55-9	4,4'-DDE	3.3	U
72-20-8	Endrin	3.3	U
33213-65-9	Endosulfan II	3.3	U
72-54-8	4,4'-DDD	3.3	U
1031-07-8	Endosulfan sulfate	3.3	U
50-29-3	4,4'-DDT	3.3	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.3	U
7421-93-4	Endrin aldehyde	3.3	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PBLKSS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: PBLKSS

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) Y

5916141

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.3	U
72-55-9	4,4'-DDE	3.3	U
72-20-8	Endrin	3.3	U
33213-65-9	Endosulfan II	3.3	U
72-54-8	4,4'-DDD	3.3	U
1031-07-8	Endosulfan sulfate	3.3	U
50-29-3	4,4'-DDT	3.3	U
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.3	U
7421-93-4	Endrin aldehyde	3.3	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

2492

000947

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16P

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616P

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616142

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16P

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616P

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616143

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16Q

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616Q

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616141

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16Q

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616Q

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/02/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616145

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

2500

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16V

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616V

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616146

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

2503

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16V

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616V

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5G1614

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16W

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616W

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616148

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK16W

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1616W

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616149

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK15X

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1615X

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/05/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616150

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK15X

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1615X

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/05/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616151

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK15Y

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1615Y

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616152

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PIBLK15Y

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) WATER Lab Sample ID: 5-266-1615Y

Sample wt/vol: _____ (g/mL) Lab File ID: _____

% Moisture: _____ decanted: (Y/N)___ Date Received: _____

Extraction: (SepF/Cont/Sonc) ____ Date Extracted:_____

Concentrated Extract Volume: _____ (uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____ Sulfur Cleanup: (Y/N) N

5616153

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

FFG02MS

Lab Name: SWL-TULSA Contract: 68-D5-0022

Lab Code: AATS Case No.: 25159 SAS No.: SDG No.: FFG02

Matrix: (soil/water) SOIL Lab Sample ID: 27670.01MS

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 11/18/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 11/19/96

Concentrated Extract Volume: 5000(uL) Date Analyzed: 12/06/96

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) Y

5616151

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	10	
76-44-8	Heptachlor	✓10	
309-00-2	Aldrin	9.8	
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	23	
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	27	
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	✓ 23	
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.1	U
5103-74-2	gamma-Chlordane	2.1	U
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

5616155

APPENDIX D

CRQLs/CRDLs

Table D-2
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Volatile Organics	CAS Number	*Contract Required Quantitation Limits* Water (ug/L)	Soil (Low) (ug/kg)	Soil (Medium) (ug/kg)
1,1,1-Trichloroethane	000071-55-6	10	10	1200
1,1,2,2-Tetrachloroethane	000079-34-5	10	10	1200
1,1,2-Trichloroethane	000079-00-5	10	10	1200
1,1-Dichloroethane	000075-34-3	10	10	1200
1,1-Dichloroethene	000075-35-4	10	10	1200
1,2-Dichloroethane	000107-06-2	10	10	1200
1,2-Dichloroethene (total)	000540-59-0	10	10	1200
1,2-Dichloropropane	000078-87-5	10	10	1200
2-Butanone	000078-93-3	10	10	1200
2-Hexanone	000591-78-6	10	10	1200
4-Methyl-2-pentanone	000108-10-1	10	10	1200
Acetone	000067-64-1	10	10	1200
Benzene	000071-43-2	10	10	1200
Bromodichloromethane	000075-27-4	10	10	1200
Bromoform	000075-25-2	10	10	1200
Bromomethane	000074-83-9	10	10	1200
Carbon disulfide	000075-15-0	10	10	1200
Carbon tetrachloride	000056-23-5	10	10	1200
Chlorobenzene	000108-90-7	10	10	1200
Chloroethane	000075-00-3	10	10	1200
Chloroform	000067-66-3	10	10	1200
Chloromethane	000074-87-3	10	10	1200
cis-1,3-Dichloropropene	010061-01-5	10	10	1200
Dibromochloromethane	000124-48-1	10	10	1200
Ethyl benzene	000100-41-4	10	10	1200
Methylene Chloride	000075-09-2	10	10	1200
Styrene	000100-42-5	10	10	1200
Tetrachloroethene	000127-18-4	10	10	1200
Toluene	000108-88-3	10	10	1200
trans-1,3-Dichloropropene	010061-02-6	10	10	1200
Trichloroethene	000079-01-6	10	10	1200
Vinyl Chloride	000075-01-4	10	10	1200
Xylene (total)	001330-20-7	10	10	1200

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Organic Scope of Work (OLM01.8), March 1990

5616153

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Table D-2 Continued
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Semi-Volatile Organics	CAS Number	Contract Required Quantitation Limits Water (ug/L)	Soil (Low) (ug/kg)	Soil (Medium) (ug/kg)
1,2,4-Trichlorobenzene	000120-82-1	10	330	10000
1,2-Dichlorobenzene	000095-50-1	10	330	10000
1,3-Dichlorobenzene	000541-73-1	10	330	10000
1,4-Dichlorobenzene	000106-46-7	10	330	10000
2,2'-Oxybis(1-chloropropane)	000108-60-1	10	330	10000
2,4,5-Trichlorophenol	000095-95-4	25	800	25000
2,4,6-Trichlorophenol	000088-06-2	10	330	10000
2,4-Dichlorophenol	000120-83-2	10	330	10000
2,4-Dimethylphenol	000105-67-9	10	330	10000
2,4-Dinitrophenol	000051-28-5	25	800	25000
2,4-Dinitrotoluene	000121-14-2	10	330	10000
2,6-Dinitrotoluene	000606-20-2	10	330	10000
2-Chloronaphthalene	000091-58-7	10	330	10000
2-Chlorophenol	000095-57-8	10	330	10000
2-Methylnaphthalene	000091-57-6	10	330	10000
2-Methylphenol	000095-48-7	10	330	10000
2-Nitroaniline	000088-74-4	25	800	25000
2-Nitrophenol	000088-75-5	10	330	10000
3,3'-Dichlorobenzidine	000091-94-1	10	330	10000
3-Nitroaniline	000099-09-2	25	800	25000
4,6-Dinitro-2-methylphenol	000534-52-1	25	800	25000
4-Bromophenyl-phenylether	000101-55-3	10	330	10000
4-Chloro-3-methylphenol	000059-50-7	10	330	10000
4-Chloroaniline	000106-47-8	10	330	10000
4-Chlorophenyl-phenylether	007005-72-3	10	330	10000
4-Methylphenol	000106-44-5	10	330	10000
4-Nitroaniline	000100-01-6	25	800	25000
4-Nitrophenol	000100-02-7	25	800	25000
Acenaphthene	000083-32-9	10	330	10000
Acenaphthylene	000208-96-8	10	330	10000
Anthracene	000120-12-7	10	330	10000
Benzo(a)anthracene	000056-55-3	10	330	10000
Benzo(a)pyrene	000050-32-8	10	330	10000
Benzo(b)fluoranthene	000205-99-2	10	330	10000
Benzo(g,h,i)perylene	000191-24-2	10	330	10000
Benzo(k)fluoranthene	000207-08-9	10	330	10000
bis(2-Chloroethoxy)methane	000111-91-1	10	330	10000
bis(2-Chloroethyl)ether	000111-44-4	10	330	10000
bis(2-Ethylhexyl)phthalate	000117-81-7	10	330	10000

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5616157

Table D-2 Continued
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Semi-Volatile Organics	CAS Number	*Contract Required Quantitation Limits* Water (ug/L)	Soil (Low) (ug/kg)	Soil (Medium) (ug/kg)
Butylbenzylphthalate	000085-68-7	10	330	10000
Carbazole	000086-74-8	10	330	10000
Chrysene	000218-01-9	10	330	10000
Di-n-butylphthalate	000084-74-2	10	330	10000
Di-n-octylphthalate	000117-84-0	10	330	10000
Dibenz(a,h)anthracene	000053-70-3	10	330	10000
Dibenzofuran	000132-64-9	10	330	10000
Diethylphthalate	000084-66-2	10	330	10000
Dimethylphthalate	000131-11-3	10	330	10000
Fluoranthene	000206-44-0	10	330	10000
Fluorene	000086-73-7	10	330	10000
Hexachlorobenzene	000118-74-1	10	330	10000
Hexachlorobutadiene	000087-68-3	10	330	10000
Hexachlorocyclopentadiene	000077-47-4	10	330	10000
Hexachloroethane	000067-72-1	10	330	10000
Indeno(1,2,3-cd)pyrene	000193-39-5	10	330	10000
Isophorone	000078-59-1	10	330	10000
N-Nitroso-di-n-propylamine	000621-64-7	10	330	10000
N-Nitrosodiphenylamine	000086-30-6	10	330	10000
Naphthalene	000091-20-3	10	330	10000
Nitrobenzene	000098-95-3	10	330	10000
Pentachlorophenol	000087-86-5	25	800	25000
Phenanthrene	000085-01-8	10	330	10000
Phenol	000108-95-2	10	330	10000
Pyrene	000129-00-0	10	330	10000

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Organic Scope of Work (OLM01.8), March 1990

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Table D-2 Continued
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Pesticides	CAS Number	*Contract Required Quantitation Limits* Water (ug/L)	Soil (ug/kg)
4,4'-DDD	000072-54-8	0.1	3.3
4,4'-DDE	000072-55-9	0.1	3.3
4,4'-DDT	000050-29-3	0.1	3.3
Aldrin	000309-00-2	0.05	1.7
alpha-BHC	000319-84-6	0.05	1.7
alpha-Chlordane	005103-71-9	0.05	1.7
beta-BHC	000319-85-7	0.05	1.7
delta-BHC	000319-86-8	0.05	1.7
Dieldrin	000060-57-1	0.1	3.3
Endosulfan I	000959-98-8	0.05	1.7
Endosulfan II	033213-65-9	0.1	3.3
Endosulfan sulfate	001031-07-8	0.1	3.3
Endrin	000072-20-8	0.1	3.3
Endrin aldehyde	007421-36-3	0.1	3.3
Endrin ketone	053494-70-5	0.1	3.3
gamma-BHC (lindane)	000058-89-9	0.05	1.7
gamma-Chlordane	005103-74-2	0.05	1.7
Heptachlor	000076-44-8	0.05	1.7
Heptachlor epoxide	001024-57-3	0.05	1.7
Methoxychlor	000072-43-5	0.5	17
Toxaphene	008001-35-2	5	165

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Organic Scope of Work (OLM01.8), March 1990

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561659

Table D-2 Continued
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Polychorinated Biphenyls	CAS Number	*Contract Required Quantitation Limits* Water (ug/L)	Soil (ug/kg)
Aroclor-1016	012674-11-3	1	33
Aroclor-1221	011104-28-2	2	67
Aroclor-1232	011141-16-5	1	33
Aroclor-1242	053469-21-9	1	33
Aroclor-1248	012672-29-6	1	33
Aroclor-1254	011097-69-1	1	33
Aroclor-1260	011096-82-5	1	33

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Organic Scope of Work (OLM01.8), March 1990

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Table D-2 Continued
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Compound List and CRQLs

Dioxin/Furans	CAS Number	*Contract Required Quantitation Limits* Water (ug/L)	Soil (ug/kg)
1234678-HpCDD	035822-46-9	25	2.5
1234678-HpCDF	067562-39-4	25	2.5
123478-HxCDD	039227-28-6	25	2.5
123478-HxCDF	070648-26-9	25	2.5
1234789-HpCDF	055673-89-7	25	2.5
123678-HxCDD	057653-85-7	25	2.5
123678-HxCDF	057117-44-9	25	2.5
12378-PeCDD	040321-76-4	25	2.5
12378-PeCDF	057117-41-6	25	2.5
123789-HxCDD	019408-74-3	25	2.5
123789-HxCDF	072918-21-9	25	2.5
234678-HxCDF	060851-34-5	25	2.5
23478-PeCDF	057117-31-4	25	2.5
2378-TCDD	001746-01-6	10	1
2378-TCDF	051207-31-9	10	1
OCDD	003268-87-9	50	5
OCDF	039001-02-0	50	5

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Organic Scope of Work (OLM01.8), March 1990

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Table D- 1
Wilcox Oil Company (CERCLIS ID OKD0001010917)
Target Analyte List and CRDLs

		Contract Required Detection Limits	
Metals	**CAS Number**	**Water (ug/L)**	**Soil (mg/kg)**
ALUMINUM	007429-90-5	200	40
ANTIMONY	007440-36-0	60	12
ARSENIC	007440-38-2	10	2
BARIUM	007440-39-3	200	40
BERYLLIUM	007440-41-7	5	1
CADMIUM	007440-43-9	5	1
CALCIUM	007440-70-2	5000	1000
CHROMIUM	007440-47-3	10	2
COBALT	007440-48-4	50	10
COPPER	007440-50-8	25	5
CYANIDE	000057-12-5	10	5
IRON	007439-89-6	100	20
LEAD	007439-92-1	5	1
MAGNESIUM	007439-95-4	5000	1000
MANGANESE	007439-96-5	15	3
MERCURY	007439-97-6	0.2	0.1
NICKEL	007440-02-0	40	8
POTASSIUM	007440-09-7	5000	1000
SELENIUM	007782-49-2	5	1
SILVER	007440-22-4	10	2
SODIUM	007440-23-5	5000	1000
THALLIUM	007440-28-0	10	2
VANADIUM	007440-62-2	50	10
ZINC	007440-66-6	20	4

Note: Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, on a dry weight basis as required by the contract, will be higher.

Source: EPA CLP Routine Analytical Services Inorganic Scope of Work (ILM01.8), March 1990

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APPENDIX E

REFERENCES

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REFERENCE 1

PRELIMINARY ASSESSMENT
of the
WILCOX OIL COMPANY

located in
BRISTOW, CREEK COUNTY, OKLAHOMA

5616165

TATE OF OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

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December 15,1994

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I. Introduction

The State of Oklahoma Department of Environmental Quality (DEQ) is tasked by the U.S. Environmental Protection Agency (EPA), as authorized by CERCLA and as amended by SARA, under the Multi-Site Cooperative Agreement (CA# V-00645-01) to conduct a Preliminary Assessment (PA) of the Wilcox Oil Company site, (CERCLIS ID # not yet assigned). The primary purpose of this PA is to assess the immediate or potential threat of wastes at the site that may impact public and environmental health and to collect information sufficient to support a decision regarding the need for further action under CERCLA/SARA. The scope of this investigation includes the review of available information from DEQ and other State agencies' files, a comprehensive target survey, and a site reconnaissance.

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II. Site Description, Operational History, and Waste Characteristics

Site Description

The original site of the Wilcox Oil Company refinery is located in the NE/4 NW/4 NW/4 of Section 29-T16N-R9E (IM) Creek County, Oklahoma, along the east side of the St. Louis and San Francisco railroad right of way and is situated about 0.75 miles northeast of the Bristow City Hall (References 1; 2; Figures 1, 2, 3). The railroad extends northeast-southwest though the NW/4 NW/4 of section 29. Another feature of the area is Sand Creek which flows to the southeast across the NW/4 of Section 29. Coordinates of the site are 35° 50' 31.39" north latitude and 96° 23' 02.05" west longitude (Reference 3).

Operations at the oil refinery site began in the 1920's and the property was sold by Wilcox Oil Company on November 1st, 1963 (References 4; 5E; 6J; 6K). It is assumed that the company operated the refinery for all of this 35 to 40 year time period. Most of the equipment and storage tanks which remained on site in 1963 were auctioned and have been salvaged for scrap iron by private land owners (Reference 5E). After conducting the PRP search and the site reconnaissance, it was found that the Wilcox Oil Company actually owned more land than was originally considered to be the site, as indicated by the Sanborn Fire Insurance Map for Bristow (References 2; 6J; 6K; 6M; 7). It was determined that the size of the site should be expanded to include approximately 75 acres north of Sand Creek in the N/2 NW/4 and 40 acres in the NW/4 NE/4 of Section 29.

A tank farm with 50,000 barrel storage tanks and surface impoundments existed on the east 80 acres of the expanded site (NE/4 NW/4 & NW/4 NE/4 of Section 29) (References 2; 5E). Most of the tank farm area is currently owned by (b) (6) of Bristow, Oklahoma; home address unknown (Reference 5E). It is rural/undeveloped

land just outside the city limits of Bristow Oklahoma, and there are no structures or storage tanks currently on this part of the site (Reference 2). On the north the land is separated from the east-west section line county road by a barbed wire fence which has an unlocked gate. The gate is located at the north quarter corner of Section 29 where a lease road enters the property, trending south along a topographic high. Another entrance to the (b) property is located along the west side where a lease road extends southeast from a private drive which trends south from the north section line road. An area of about 2.5 acres in the northwest corner of the tank farm area is fenced. This is believed to be a gas pipeline compressor station (Reference 5S). A pipeline easement extends to the southeast from this location (Reference 2). It is marked with flagging and identifiable as a cleared path about twenty five feet wide. A south trending creek is located along the eastern portion of the (b) property (Reference 2). The eastern part of the property drains to the south and southeast while surface drainage in the west is to the southwest and south (Reference 2; Figure 1). The eastern 1/4 of the property is heavily wooded (Reference 2). While a tree line is present along the southern fenced property boundary and trees are randomly scattered elsewhere, most of the remaining areas of the property are covered with grasses and brush (Reference 5). The land to the south is cleared of trees and is probably used for agricultural purposes, either farming or for grazing cattle (Reference 2).

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The original refinery site, which is located inside the fenced area just east of the railroad right of way, is currently owned by (b) (6) and covers approximately 13 acres (References 1; 6A; 6L; 7). The (b) (6) property, which is completely fenced on all sides with a locked gate entrance on the north side, is located within a rural/underdeveloped setting just northeast of Bristow (Reference 2). The east-west section line road marks the north boundary of the property. The west side borders the railroad right of way. On the east side is a private drive extending south from the section line road. About 400 feet south of the section line road the fence angles southwest from the private drive then turns south after crossing a small creek and continues to Sand Creek. The southern border of the property is marked by the fence's position along the north bank of Sand Creek. The total area is about 18 acres, which is larger than what is described on their deed (13 acres, more or less) due to the fact that the fence extends all the way to Sand Creek (References 2; 5E).

Four storage tanks (12,500 gallons each) and an abundant number of pipe pieces and scrap iron are present on the (b) (6) property (Reference 2). There are several brick structures remaining on the west side near the railroad right of way. One of the old facility structures located on the north side next to the section line road is being used as a residence. Concrete tank, tower and facility foundations are present at numerous places. A small south trending creek is located along the east side of the (b) (6) property. Surface drainage is to the east and south (Reference 2; Figure 1). Trees and dense vegetation are present along the banks of the creeks and on the west side of the property. The remnants of several tanks, which had been salvaged for scrap iron, are

present (References 2, 5E).

The property bordering the railroad right of way on the west is owned by the Bristow First Assembly of God church (Reference 6B). The southern boundary of the church property is Sand Creek. The western and northern boundaries are believed to be the section lines. There are no fences. A gravel drive enters the property from the northeast corner to a gravel parking lot north of the church building itself Reference 2). The building west of the church is a residence (Reference 5R). South of the church is an unoccupied mobile home which is to be used as a residence (Reference 5R). Two storage sheds are present near the mobile home. The ground is covered with mowed grass except for the parking lot and for trees located along the bank of Sand Creek. The church property drains to the west and south (Reference 2; Figure 1).

There are no schools or day-care centers near the site (References 2; 5R). There are three residences considered to be on site (References 2; 5E; 5Q; 5R). A residential area of Bristow is located just south of the (b) (6) property across Sand Creek (Reference 2). Four residences are located just north of the east-west section line road which marks the northern extent of the refinery site (Reference 2). Activities at the site involve domestic activities associated with the residences; salvaging of scrap iron from the remaining refinery equipment on the (b) (6) property; activities associated with the church; hunting on the (b) property; and occasional dirt work on all the properties (References 2; 5Q; 5R; 5S).

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Operational History

The Wilcox Oil Company operated a crude oil refinery from the 1920's to early 1960's (References 4; 6). It was operated as a pilot project from about 1920 to 1928 at 1,000 barrels of oil per day by Riley Petroleum Company (Reference 4). The Sanborn Fire Insurance Map shows the various components of the facility (Reference 7). A modern skimming and cracking plant was constructed in 1929 which had an operating capacity of 4,000 barrels of crude oil per day (BOPD) (Reference 4). The main components of the new system consisted of a skimming plant, cracking unit, and redistillation battery with a vapor recovery system and continuous treating equipment (Reference 4). The crude oil was brought directly from the field, which eliminated storage and handling facilities but resulted in crude with high bottom sediment and water (b. s. & w.) (Reference 4). It is assumed that Wilcox Oil Company expanded operations at some later date since they acquired the former Lorraine Refinery facility west of the railroad and the tank farm area to the east (References 4; 6). Wilcox Oil Company acquired the original site (NE/4 NW/4 NW/4 of Section 29) on October 11, 1928, from (b) (6) (Reference 6J). The company sold the original site plus the expanded areas totaling about 110 acres, more or less, to (b) (6) on November 1, 1963 (Reference 6K). Wilcox Oil Company no longer operates in Oklahoma (Reference 5O). It is believed that this company merged with Tenneco Oil Company in 1967 (References 5O; 6). Tenneco operates in Oklahoma and is "in good standing" with the Secretary of State (Reference

5O). [redacted] acquired the original refinery site from [redacted] on March 27, 1973 (References 6A; 6L).

DEQ received positive responses to its inquiries concerning access to the site from the current owners who, according to Oklahoma County Assessor's Office, are [redacted] and [redacted] and the Bristow First Assembly of God church (References 6; 8). An on site reconnaissance was conducted by DEQ on December 16, 1994 (Reference 2). There are no existing complaints regarding the site in the Creek County Health Department files or records from other state institutions including the Corporation Commission, the Water Resources Board, and the Department of Environmental Quality (References 5J; 5K; 5L; 5M; 5N).

Waste Characteristics

The raw crude oil contained high percentages of bottom sediment and water (b. s. & w.), that was separated and represents the initial component of the waste stream at the site. The suspected waste stream components are: b. s. & w. (i.e., tank residues & brine); acid and caustic sludges; lead (sodium plumbite, Na_2PbO_2); coke; elemental sulfur; and possibly solvents (References 2; 4). Waste volumes are estimated to be large, i.e., at 1 % b. s. & w., the 4,000 BOPD refinery capacity would result in a waste stream of 40 barrels per day of waste if operated at capacity. The coke production was reported to be 7 to 8 tons per month which was transported off site by railroad and sold (Reference 4). The sodium plumbite was used as a Doctor solution additive for gasoline odors (Reference 4). Other potential contaminants such as the products (naphtha, gasoline, kerosine, fuel oil, and furnace oil) and raw crude oil are excluded under CERCLA (References 4; 9).

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The soil survey classification for the site is oil-waste land which indicates that the area was impacted in 1950 by oil and salt water wastes from oil wells (Reference 10). This classification corresponds to miscellaneous land types which are gullied and eroded and are almost bare of vegetation. Comparison of aerial photos taken in 1941 with one flown in 1991 shows that there is quite a bit more vegetation currently (References 3B; 3E). Several surface impoundments containing oily sludge totaling about 4 acres in area are visible on both photos in the NE/4 NW/4 of Section 29 (References 3; 3B; 3E; Photo 1).

About 6.5 acres of asphalt-like material (presumably tank bottoms) is present within the storage tank retention berms located in the 80 acre tank farm area (References 3; 3F). The original refinery site (the [redacted] property) contains some refinery equipment in various states of disrepair and several brick structures (References 3; 1; 7). An area barren of vegetation about 2 acres in size (200 by 400 feet) is present in the south central portion of the [redacted] property (References 3; 3F; Photo 2). Coke and asphalt-like material is scattered over the ground surface in two areas about 1 acre (200 by 200 feet) each in size (References 3; 3F; Photo 3). What appears to be tank bottom sediment and

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oily sludge was observed in one remnant tank bottom (Reference 3; Photo 4). This material is presumed to be present in the remaining four tanks on this site and in the bermed areas, totaling about 1 acre in size (Reference 3; 3F). The church's property has several areas, totaling about 5,000 square feet in size that have barren to sparse vegetation (Reference 3). Apparently, some oily waste was discovered on site about 2 feet below ground level when the church installed lateral lines (Reference 5U). Due to the evidence presented above, it will be assumed in this investigation that approximately 15.5 acres of the on site surface has been contaminated with hazardous substances.

III. Pathway and Environmental Hazard Assessment

Groundwater

The Barnsdall Formation outcrops at the Wilcox Oil Company refinery site and potentially receives ground water recharge from downward infiltration of precipitation falling on the ground surface (Reference 11). The Barnsdall Formation is a bedrock aquifer but is not considered to be a Principal Ground Water Resource by the Oklahoma State Department of Health (Reference 11). The site is in close proximity to an alluvial aquifer located less than one half mile to the south (Reference 11).

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The alluvial deposits consist of wedge shaped layers of sand, silt, clay, and gravel. These deposits are found along Sand and Little Deep Fork Creeks and range from 0 to 100 feet in thickness (Reference 11). The Barnsdall Formation is approximately 200 feet thick at the site and consists of massive to thin beds of coarse to fine grain sandstone, irregularly interbedded with sandy to silty shale (Reference 11).

There is no indication that the site is located in an area of karst terrain (Reference 11; Figure 1). There are no faults mapped at the site (Reference 11). The soil survey has mapped the site as oil-waste land (Reference 10), indicating contamination at the ground surface. The Stephensville and Darnell fine sandy loam series (sloping) are the soils most likely associated with the site prior to being impacted by oil-field activities (Reference 10). These soils are well drained and are present from shallow to moderate depths (Reference 10). Sandstone outcrops are fairly common (Reference 10). Runoff is slow to moderate and internal drainage is moderate to rapid (Reference 10). The average annual precipitation is 37.19 inches (Reference 10) and the recharge to ground water is estimated to be about 10 per cent of the precipitation (Reference 11); thus, it is 3.7 inches per year.

The upper part of the Barnsdall Formation and the alluvial aquifer are unconfined, with a shallow water table, and are very susceptible to ground water contamination by potential wastes or contaminated soils at the site (Reference 11). Depth to the shallowest water bearing formation is less than 25 feet (Reference 11). However, a depth of sixty feet was reported for the first water saturated sandstone in a domestic water well

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located in the SW/4 SW/4 SW/4 of Section 20-T16N-R9E which is less than a quarter mile north of the site (Reference 11). Recharge to the shallow part of the Barnsdall Formation at the site and discharge of ground water to the alluvial aquifer to the south are probable contamination mechanisms occurring at the site (Reference 11). Since shale beds occur within the Barnsdall Formation, recharge to the deeper part of the aquifer is probably restricted (Reference 11). However, pumpage from this zone could cause leakage of ground water from the strata above (Reference 11). Thus, the deep part of the Barnsdall Formation is also susceptible to ground water contamination by potential wastes or contaminated soils at the site. Two abandoned oil exploration wells located less than a quarter mile to the southeast of the site may represent potential routes for ground water contamination of the deeper parts of the Barnsdall aquifer (Reference 11). Two water wells, one of which is contaminated with petroleum, were drilled to depths around 200 feet on the (b) (6) (References 5E; 5H). They have been abandoned and plugged (References 5H; 5Q). The integrity of the plugging is suspect (Reference 5H); therefore, these wells may act as conduits for contamination to reach the deeper parts of the aquifer. There may be an unplugged refinery well located south of the church since an open six inch casing has been observed there, and two wells are indicated on the Sanborn Fire Insurance map (References 3; 5R; 7).

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The site lies just northeast of Bristow, Oklahoma. Generally, the majority of the population in the area of interest is served by public water supplies from the City of Bristow, but some residences have private water wells within the four mile study radius of the site (References 12; 13; Figure 4). The City of Bristow obtains its water supply solely from wells in the Barnsdall Formation and the Vamoosa-Ada aquifer (References 2; 5A; 13). The nearest water well, which is a domestic well 110 feet deep, is located on site, south of the church (References 2; 5R; 5U; Figure 2). However, this well, which was perforated at 40 feet in a shallow water zone, has been abandoned as a drinking water source because of contamination from petroleum (References 5R; 5U). It has not been plugged, however, and could be put into operation (References 5; 8U). The Sanborn Fire Insurance Map shows two refinery water wells on either side of the railroad (Reference 7). Two deep wells have been drilled on the (b) (6) property but were plugged and abandoned because one became contaminated with petroleum waste and the other one had collapsed casing (Reference 5E; 5H). The residences on site are presently connected to city water via a 2 inch line (Reference 5E; 5H; 5R). The nearest active drinking water well is within one quarter mile north of the site (References 11; 13; Figure 2; 4), and serves an estimated population of 2.68 (Reference 13). It is 230 feet deep and produces water from sandstones in the lower part of the Barnsdall Formation (Reference 11). It is assumed that the vast majority of residences in the study area utilize municipal water; however, since most domestic wells are located outside the city, these wells are assumed to be sources of drinking water (References 11; 13; Figure 4). The total population served by private wells is described in the table below. The numbers were arrived at by multiplying the number of wells by the estimated average number of persons (2.68) within each household in Creek County (Reference 14).

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Private Wells

Distance from Site (mi)	# of Wells	Est. Population Served by Private Wells
On-site	1	2.68
0 - 1/4	1	2.68
1/4 - 1/2	0	0
1/2 - 1	4	10.72
1 - 2	25	67.00
2 - 3	20	53.6
3 - 4	29	77.72
Total	**80**	**214.4**

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There are eight active public water wells distributed across two study radius zones that make up the City of Bristow Municipal Water System (References 5A; 13). Bristow obtains its water supply solely from wells that are within the study area (Reference 5F). Two municipal wells were located about one quarter mile south and southwest of the site (References 11; 13). They were approximately 200 feet deep and produced from the Barnsdall Formation; but they have been abandoned (References 5A; 13). However, Well #7, the one located less than 1/4 mile southwest of the site was not plugged but has a welded steel cap and is capable of producing. The nearest active municipal well is located almost one mile southwest of the site (References 5A; 13). It also produces from deep sandstones of the Barnsdall Formation (Reference 5A; 13). There are no surface water intakes in the system which serves 4,300 people of Bristow and 116 people of Slick, Oklahoma (References 13; 15). There are four water storage towers within the distribution system (Reference 13). This is a blended system in which two large capacity wells (200 gpm) and one small capacity well (50 - 90 gpm) are produced together during 24 hour periods (Reference 13). The specific wells are changed periodically. Under this scheme, one well provides more than forty per cent of the daily water supply but not more than forty per cent of the total annual production (Reference 13). The population served by each well is apportioned according to the estimated annual production capacities of the individual wells (Reference 13). Well #14 is located in the 1/2 to one mile radius zone and the other municipal wells are located in the one to two mile zone. Thus, the apportioned population served by Well #14 is located in the 1/2 to one mile radius zone, while the rest of the population is placed in the one to two mile zone. A public well in the one to two mile radius zone serves the 50 residents of the Evergreen

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Trailer Park (Reference 13). The 50 residents of the Fogle Mobile Home Park formerly used a well, which was located in the one to two mile radius zone, but they are currently using city water (Reference 13). The status of this well is unknown. The 116 residents of the Slick Rural Water Association also obtain their water supply from Bristow (Reference 13). Considering the 4,416 people served by the 8 wells of the Bristow Municipal Water System and the 50 people of the Evergreen Trailer Park served by one well, the total population served by public wells (4,466 people) is described in the table below (Reference 13). The one municipal well which is abandoned but not plugged is also included in the table.

Public Wells

Distance from Site (mi)	# of Wells	Est. Population Served by Public Wells
On-site	0	0
0 - 1/4	1	0
1/4 - 1/2	0	0
1/2 - 1	1	165
1 - 2	8	4301
2 - 3	0	0
3 - 4	0	0
Total	**10**	**4466**

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There are no Well Head Protection Areas within a four mile radius of the Site (Reference 5I). As a result of historical practices at the site, a release of hazardous substances from the Wilcox Oil Company refinery site to the groundwater is suspected. In fact, ground water contaminated by petroleum has been observed in a well on site (References 3; 5R; 5U). The private wells located outside the city limits of Bristow are assumed to be drinking water supply wells. Those wells close to the site which produce from the shallow ground water are at considerable risk of contamination, as in the case of the well on the church's property. However, wells that produce from the deeper zones in the Barnsdall Formation are at less risk of contamination because of the presence of shale beds between the contaminated zone above and the water producing zone below (Reference 11). The nearest of the domestic wells that utilize shallow ground water for drinking purposes are located more than 1/2 mile away in an up-gradient direction, and the wells within 1/2 mile produce from the lower part of the aquifer. Therefore, the

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residences served by these wells are considered secondary targets. The population served by public wells are also considered secondary targets due to the distance of the wells from the site. Since the church's well on site is not currently being used for drinking water and since the well located within 1/4 mile north of the site produces from the deeper parts of the Barnsdall Formation, these wells are not considered to be primary targets.

Surface Water

The topography in the vicinity of site is relatively flat being situated on the noses of several south trending highs (Reference 2; Figure 1). There are two south trending tributaries of Sand Creek on site (Reference 5; Figure 1). Sand Creek, which marks the southern boundary of the western part of the site is a small perennial tributary of the Little Deep Fork Creek and flows southeasterly across the NW/4 of Section 29 (Figures 1). Sand Creek enters the Little Deep Fork about 3.5 miles downstream from the PPE (Figure 3). The probable point of entry (PPE) into Sand Creek is on site and occurs in the SE/4 NW/4 NW/4 of Section 29-T16N-R9E (IM) in Creek County, (Figures 1; 2; 3). The 15 mile target distance ends in the Little Deep Fork Creek just south of Slick, within Section 20-T15N-R10E (IM) of the same county (Reference 16; Figure 3). A mean annual flow rate of 806 cfs was recorded at gaging station #2435, which is located on the Deep Fork River in the NW/4 SW/4 of Section 20-T14N-R12E of Okmulgee County, down stream from the confluence with the Little Deep Fork Creek (Reference 17). This was the nearest available information on flow rate. Assuming that less than half the flow at the gaging station is attributed to the Little Deep Fork, then the maximum flow for the Little Deep Fork at the confluence would be about 400 cfs. Using the same reasoning, the maximum flow of Sand Creek at the confluence with the Little Deep Fork would be approximately 200 cfs. However, there are two tributaries that enter the Little Deep Fork after the Sand Creek confluence (Skull and Chicken Creeks) and before the 15 mile target distance (Reference 16; Figure 3). Two additional creeks flow into the Little Deep Fork after the 15 mile end point. Assuming that all five tributaries have similar flow characteristics, then the maximum flow of Sand Creek at the confluence with the Little Deep Fork would be 50 cfs. However, the creek, which is shown as a perennial stream on the topographic map (Reference 16; Figure 1), may not flow at times during the late summer months (Reference 5P).

The normal annual precipitation in the region of the site is about 37.19 inches per year (Reference 10). Portions of the site are located within the 100 year flood plain which is located along Sand Creek and the south trending tributary on the east side of the (b) property (Reference 18). There are no drinking water intakes located within the 15 mile (6) target distance (Reference 15).

Sand Creek is considered by the State of Oklahoma to be in the "habitat limited aquatic community" subcategory of the fish and wildlife propagation beneficial use and within the "secondary body contact" category of the recreational beneficial use (Reference 19). The

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Little Deep Fork Creek is placed in the "warm water aquatic community" subcategory of the fish and wildlife propagation beneficial use and within the "primary body contact subcategory for recreational beneficial use (Reference 19).

Habitats of the endangered and threatened species listed below are known to occur in Creek County and may also be associated with the 15 mile target distance (Reference 20). Although the location of the site is near an urbanized area (Figures 1; 3), it is possible that these species would be found in the vicinity of the site (Reference 20). However, since no sightings have been observed or reported, all species listed below are considered secondary targets (References 2; 23).

Species	Federal Status
Bald Eagle	Endangered
Interior least tern	Endangered
Peregrine falcon	Endangered
Piping plover	Threatened
Cerulean warbler	Category 2 Candidate
Loggerhead shrike	Category 2 Candidate
Prairie mole cricket	Category 2 Candidate
Arkansas River speckled chub	Category 2 Candidate
Texas horned lizard	Category 2 Candidate
Western Snowy plover	Category 2 Candidate
Fissa sedge (Carex fissa)	Category 2 Candidate

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There are about 30 miles of wetland frontage associated with the 15 mile target distance (Reference 21). The nearby Sand Creek and Little Deep Fork Creek have a potential for contamination from the site. In fact, a seep was identified in Sand Creek just west of the church property (Reference 2; 5R). Also, the oily sludge flowing out of the surface impoundments in the NE/4 NW/4 of Section 29, which have had their berms recently cut by bull dozer, will likely reach Sand Creek by surface drainage (Reference 2).

Soil Exposure

The site is an abandoned crude oil refinery located near residential areas (Reference 2; Figure 1; 3). The presence of soil contaminated by hazardous substances is assumed to be about 15.5 acres because of evidence found during the site reconnaissance (Reference 2). There are three residences located on site (Reference 2). The (b) (6) property, encompassing about 18 acres, is completely enclosed with a fence, and has the only controlled access on the site (Reference 2). There are about eight people living on site and an additional 11 people living within 200 feet of the site (Reference 2). These

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people are considered as primary targets. The site is inactive so there are no workers employed at the facility (Reference 2). There are no schools or day-care centers within 200 feet (Reference 2). The estimated total population within 1 mile of the site is 2,393. This number is based on a house count taken during the site reconnaissance, the average number of persons (2.68) per household, and the Geographical Exposure Modeling System (GEMS) data (References 2; 14; 22). Several types of activities occur at the site including: occasional earth work; salvaging scrap iron; domestic activities associated with the residences on site; activities associated with the church; and some hunting (References 5; 8S). The Oklahoma Natural Heritage Inventory has no records of terrestrial sightings of rare species within 5 miles of the site (Reference 23).

Air

An air release is suspected since there were unusual odors observed during the site visit (Reference 2). The prevailing wind direction is from the north during the months of December through February and from the south the rest of the year (Reference 10). There is an estimated population of 8 persons who live in residences on site (Reference 2). Habitats of the endangered and threatened species listed under the surface water pathway are considered secondary targets (Reference 23). The estimated population and wetland acreage within the four mile radius of the site is described in the table below (Reference 24).

Distance from Site (mi)	Est. Population	Est. Wetland Acreage
On-site	8	2*
0 - 1/4	54	4.5
1/4 - 1/2	495	7
1/2 - 1	1,836	9
1 - 2	2691	65
2 - 3	1,017	145
3 - 4	517	112
Total	6,616	342.3

* - estimated.

There are an estimated 2 acres of wetlands present on site when the expanded site area is considered (Reference 2). Vegetation suggesting the presence of wetlands (cattails) was observed during the site reconnaissance in one surface impoundment and there are wetlands associated with Sand Creek (Reference 2; 23).

000983

IV. Summary and Conclusion

The Wilcox Oil Company operated a refinery outside of the city of Bristow in Creek County, Oklahoma, for an estimated period of 35 to 40 years. As a result of this practice, ground water at the site has been adversely affected by potentially hazardous substances associated with the site. However, the private wells within the study area are located either in areas served by municipal water systems; located at relatively safe distances and up-gradient from the site; or produce from the deeper part of the Barnsdall Formation below shale beds. Therefore, the residences served by these wells are considered secondary targets. The population served by public wells are also considered secondary targets due to the distance between the wells and the site.

Sand Creek receives suspected contaminated runoff from the site so the associated wetlands would be primary targets. The habitats of threatened or endangered species and the warm water aquatic community "fishery" of the Little Deep Fork Creek are considered secondary targets. An air release is suspected due to the odors detected during the site reconnaissance. Contaminated soil is assumed because of the barren areas and stressed vegetation observed during the site reconnaissance. The residents on site are considered primary targets under both these pathways. Also, residents within one quarter mile are considered primary targets under the air pathway. Considering the fact that there are primary targets associated with the air, surface water, and soil pathways; and because subsurface contamination of ground water and soils at the site have been observed, a Site Inspection is recommended in order to better characterize the site and to determine whether threats to human health and the environment exist.

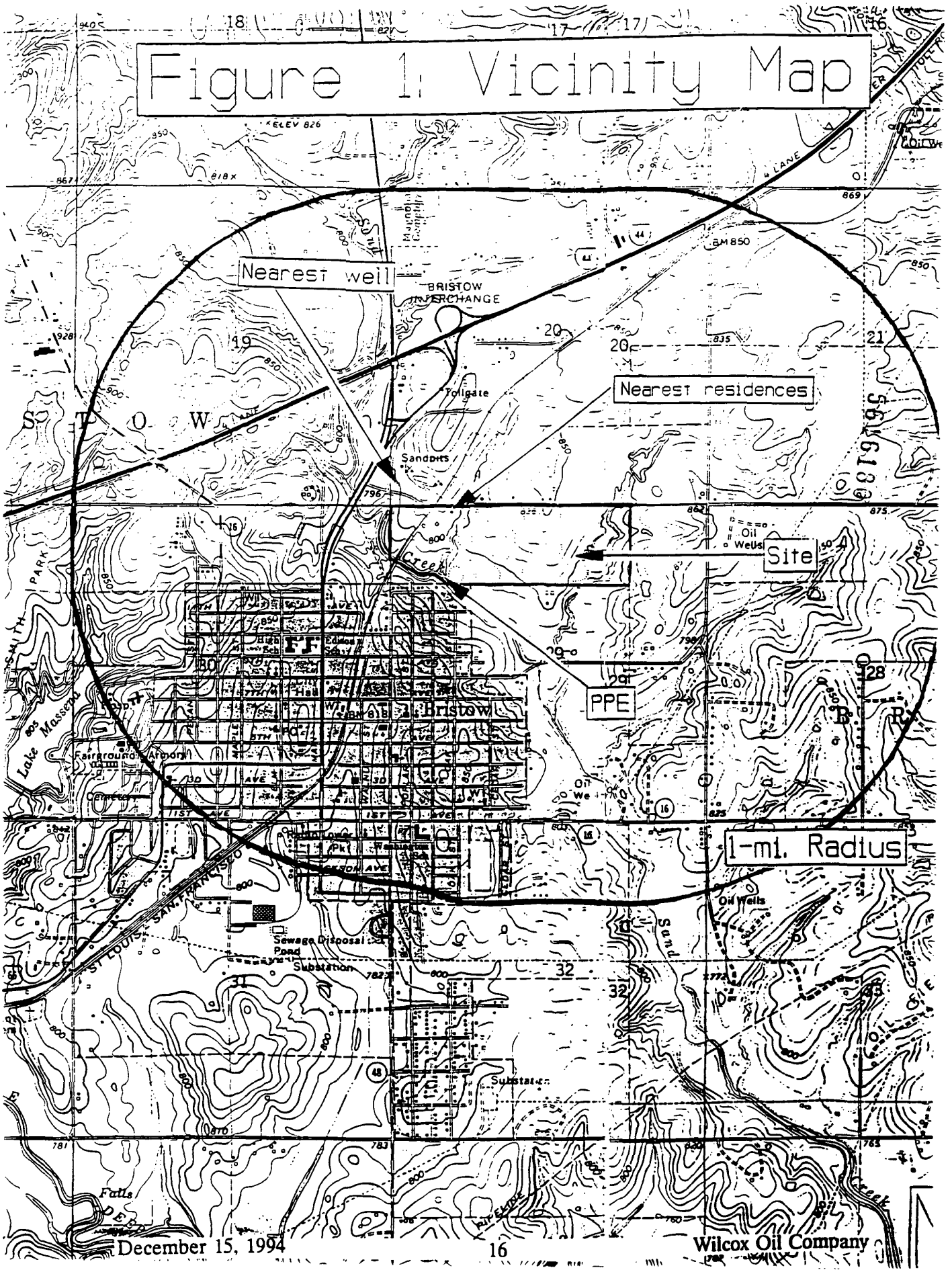
56.6178

000984

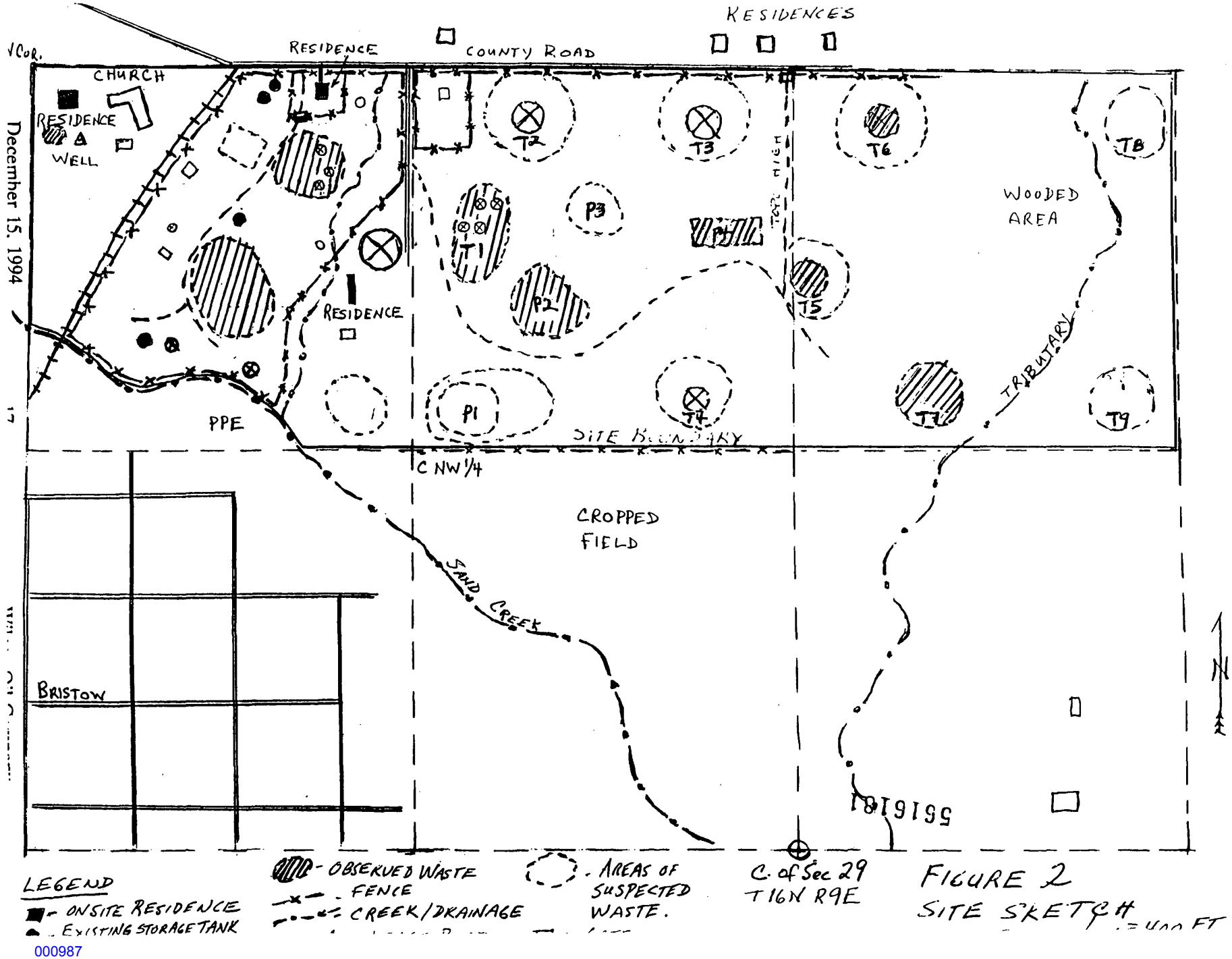
V. Figures

5616179

000985

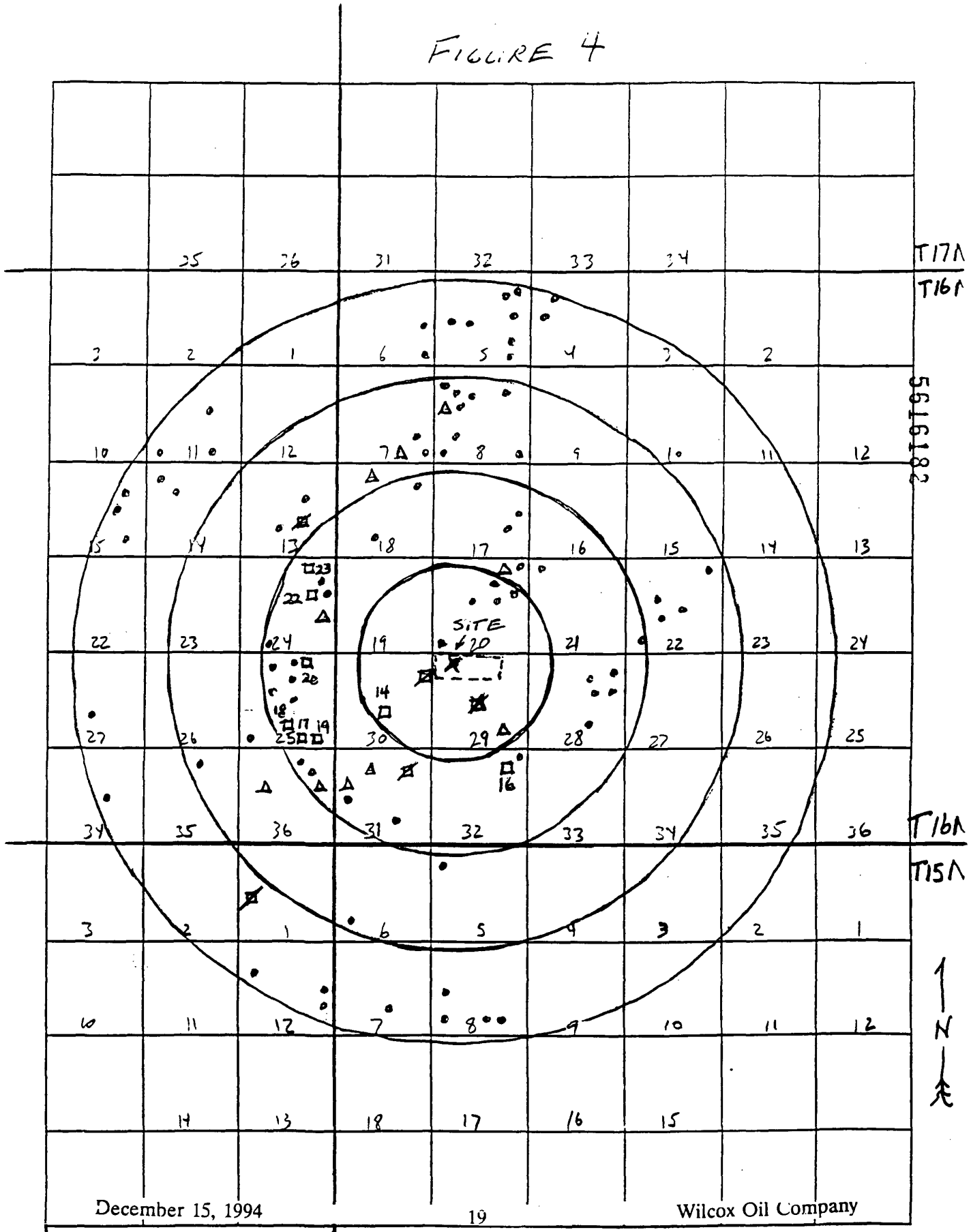

Figure 1: Vicinity Map
Nearest well
Nearest residences
Site
PPE
1-mi. Radius
BRISTOW INTERCHANGE
Tollgate
Sandpits
Bristow
Fairgrounds Airport
Sewage Disposal Pond
Substation
Oil Wells
Falls Creek
Sand
Lake Massena
SAN FRANCISCO ST LOUIS
PARK
1ST AVE
30 AVE
50TH AVE
BM 850
ELEV 826
T 19 N
R 8 W
R 9 E
R 10 E
19
20
21
28
29
31
32
33
16
17
18

000986


RESIDENCES
COUNTY ROAD
RESIDENCE
CHURCH
RESIDENCE
WELL
T2
T3
T6
T8
WOODED AREA
P3
T1
P2
T5
RESIDENCE
TRIBUTARY
PPE
P1
T4
T7
T9
SITE BOUNDARY
C NW 1/4
CROPPED FIELD
SAND CREEK
BRISTOW
LEGEND
ONSITE RESIDENCE
EXISTING STORAGE TANK
OBSERVED WASTE
FENCE
CREEK/DRAINAGE
AREAS OF SUSPECTED WASTE.
C. of Sec 29 T 16N R9E
FIGURE 2
SITE SKETCH
December 15, 1994

000987

FIGURE 4



- DOMESTIC
- PUBLIC

⊠-ABANDONED MUNICIPAL

000988

Figure 3: Surface Water Migration Route

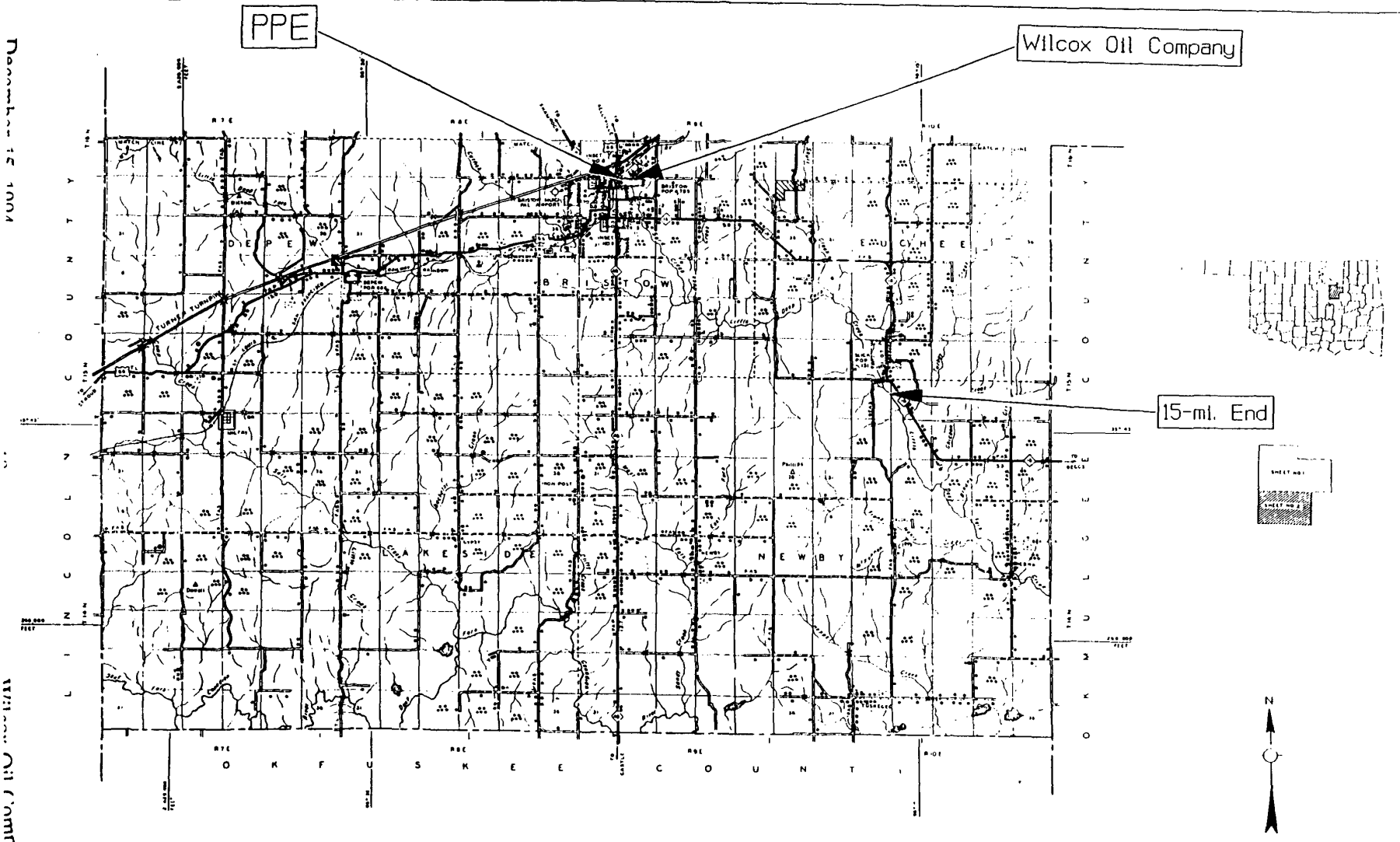
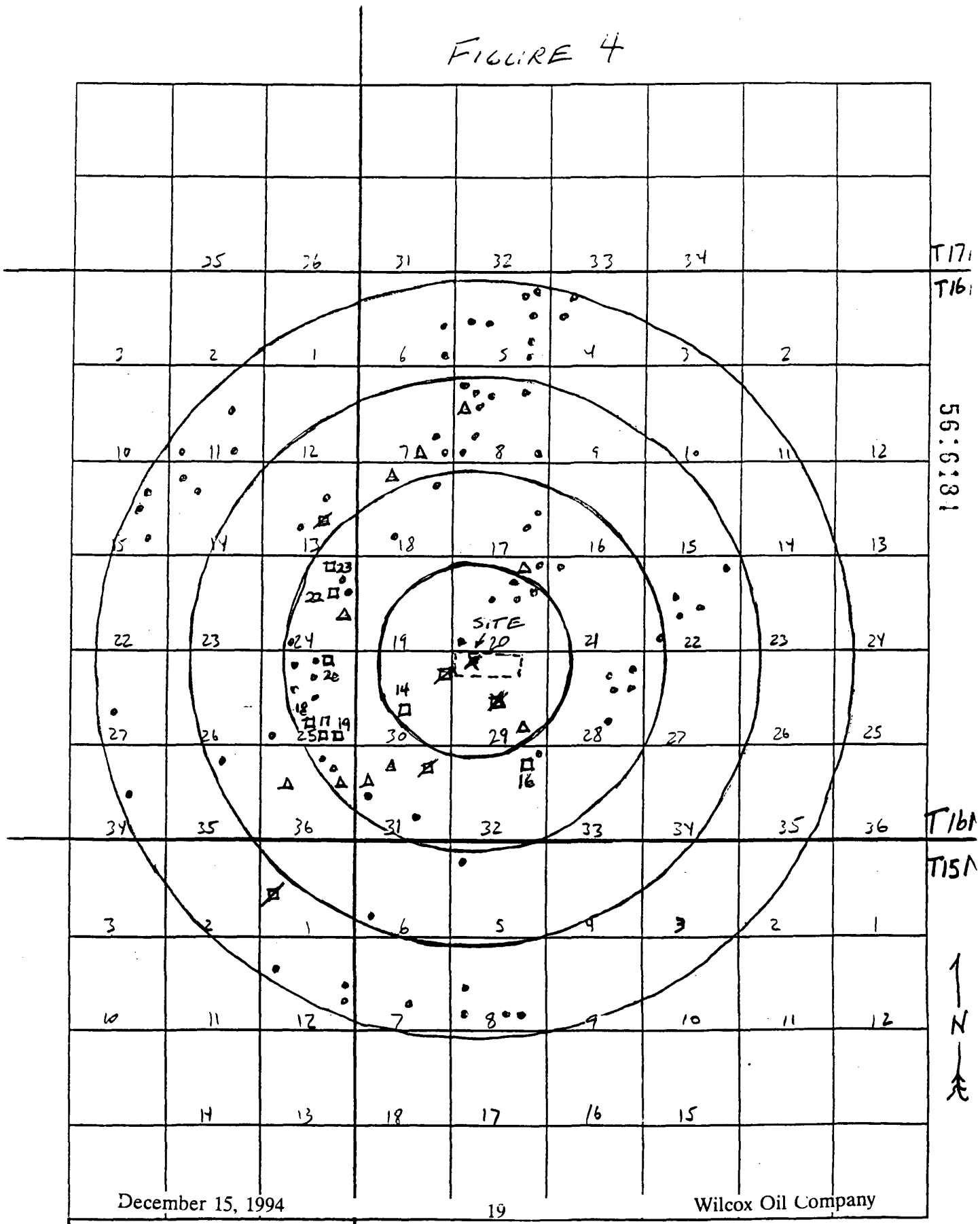


FIGURE 4



000990

VI. Photodocumentation

5616185

000991

Photographer: Karen Khalafian
Date: December 16, 1994

Witness: David Cates
Direction: North



Comments: Photograph #1 (matches slide #21). This photo shows the oily sludge in the surface impoundment on (b) (6) property (in the NE/4 NW/4 of Section 29).

000992

Photographer: Karen Khalafian
Date: December 16, 1994

Witness: David Cates
Direction: Southeast



Comments: Photograph #2 (matches slide #8). This photo shows the area of contaminated soil in the south central portion of the (b) (6) property (NW/4 NW/4 of Section 29).

000993

Photographer: Karen Khalafian
Date: December 16, 1994

Witness: David Cates
Direction: East



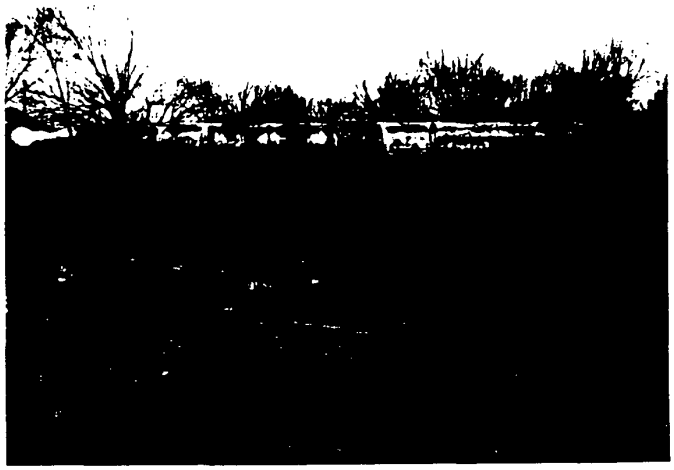
5616188

Comments: Photograph #3 (matches slide #12). This photo shows the coke and asphalt-like material covering the ground on the (b) (6) property (NW/4 NW/4 of Section 29).

Photographer: Karen Khalafian
Date: December 16, 1994

Witness: David Cates
Direction: East

5616189



Comments: Photograph #4 (matches slide #6). This photo shows the oily sludge in the bottom of a partially salvaged tank located on the (b) (6) property (NE/4 NW/4 NW/4 of Section 29).

VII. List of References

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11. Cates, D. A., DEQ. *Memorandum: Hydrogeology and Ground Water Use, Wilcox Oil Company Refinery Site, Creek County, Oklahoma.* November 8, 1994.

12. Stegmann, S., DEQ. *Letter of Request: Gary Glover, Oklahoma Water Resources Board.* August 5, 1994. (Response attached).

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56.6130

000996

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17. Heimann, D. C. and Tortorelli, R. L. *Statistical Summaries of Streamflow Records in Oklahoma and Parts of Arkansas, Missouri, and Texas Through 1984.* U.S Geological Survey Water-Resources Investigations Report 87-4205. 1988. Pages 3, 226, & 227.

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20. U.S. Fish and Wildlife Service. *Oklahoma Federal Listed, Proposed, and Candidate Threatened and Endangered Species.* Creek County. January 1994.

21. U. S. Department of the Interior, Fish and Wildlife Service. *National Wetlands Inventory Maps (7.5 minute quadrangles).* Bristow; Slick; Lake Heyburn; Bellvue.

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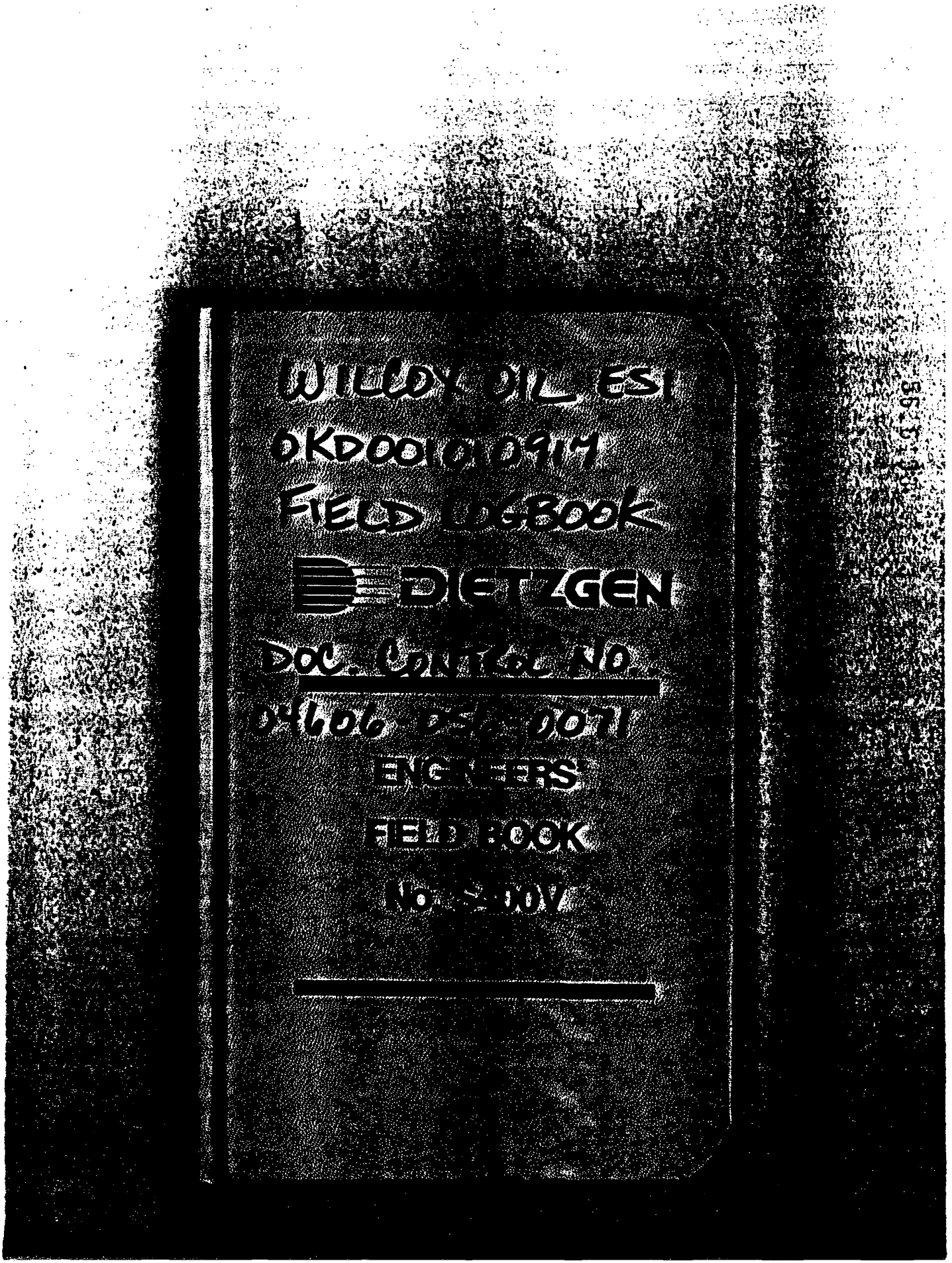
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55:6191

000997

56'6192

REFERENCE 2


WILLOX OIL ESI
OKDOOLG 0914
FIELD LOGBOOK
DIETZGEN
DOC. CONTROL NO.
ENGINEERS
FIELD BOOK

INDEX PAGE

JOB NO.	PROJECT	PAGE NUMBER

DGW WILCOX OIL (WILCOX) 8/16/96

0830 DIANE G. WILLIAMS (DGW) STEVE MITCHELL (SSJM) DEPART TULSA FOR SITE. HOLD HEALTH & SAFETY MEETING

0900 ARRIVE AT SITE (b) (6) NOT PRESENT.

0920 DGW/SSJM CALL & LEAVE MESSAGE FOR (b) (6)

0925 RETURN TO SITE. STOP & TALK WITH PASTOR (b) (6) AND DEACON (b) (6)

0930 DEPART FOR MCALESTER TO PICK UP EQUIPMENT (SHIPPED TO WRONG HOTEL)

2:30 ARRIVE BACK AT SITE AND CALIBRATE QUA TO 98.5 ppm METHANE

56.6194

DGW WILCOX 8/16/96

MEET WITH (b) (6)
(b) (6)
QUA FLAME OUT.

DRIVE SITE W/ (b) (6)
OBSERVED SEEPS OF BLACK OILY SUBSTANCE NUMEROUS BERMED AREAS W/ WHAT APPEAR TO BE TANK BOTTOMS. PETROLEUM-LIKE ODORS.
WILLIAMS CO. PIPELINE RUNS THROUGH PROPERTY.

BERM CUT ON PIT + OIL MIGRATING TOWARD CREEK.

CHILDREN FROM NEARBY MOBILE HOME PARK TRESSPASS ON PROPERTY (PLAY) ALMOST EVERY OTHER DAY

DGW WILCOX 8/16/96

1535 DRIVE TO CHURCH MEET W/ PASTOR (b) (6)
NOTED MAINLY DEBRIS + HARD-ASPHALT-LIKE MATERIAL IN YARD.
WELL IS PLUGGED; HAD OILY SUBSTANCE (PETROLEUM) IN IT.

1600 MEET WITH (b) (6)
(b) (6) HE HAS OBSERVED NO OILY MATERIALS ON HIS PROPERTY. ~~SSM~~ DGW
HE PERIODICALLY CUTS UP TANKS + SALVAGES METAL.

1610 DGW/SM DRIVE PROPERTY.
OBSERVED PIT IN BACK WITH (b) (6) SALT-LIKE RESIDUE. SOME OLD STRUCTURES AND TANKS STILL STANDING.

(b) (6) ALSO SAID

96:9:95

DGW WILCOX 8/16/96

THERE ARE FISH PRESENT IN SAND CREEK.

ADDITIONAL NOTES:

(b) (6) THOUGHT RESIDENCES NORTH OF SITE ARE ALL ON WELL WATER (PRIVATE).

SJM/DGW OBSERVED REMNANT CONCRETE STRUCTURES AND BLACK STAINED SOIL NORTH OF SITE.

(b) (6) LIVES NORTH OF SITE & SAID THE AREA NORTH OF SITE ALSO OPERATED AS A REFINERY AND THAT THE PROPERTIES HAVE REMNANT TANKS, AND BLACK DISCOLORED SOILS. ALL OF THESE RESIDENCES ARE REPORTEDLY ON PRIVATE WATER WELLS.

1630 DEPART SITE FOR FEDEX

Diane D. Williams

96:9 99

INDEX PAGE

JOB NO.	PROJECT	PAGE NUMBER

JLI Wilcox Oil 11/18/96

0630 Team met for breakfast. Held Health & Safety meeting.
Team members are
Diane Williams (DGW)
Eric Taste (EET)
Jay Shigo Cui (JLI)
Pete Reeng (PMR)

0930 Arrived at site
PMR: EET calibrated OVA to 98.5 ppm methane
EET calibrated MiniRAM.
DGW: JLI left site for supplies

1030 JLI: DGW returned to site

1055 DGW/JLI collect SED-01 from SAND CREEK UPSTREAM OF CONFLUENCE WITH INTERMITTENT CREEK. FINE LT. BROWN SAND/SILTY SAND WELL SORTED, SAT. SAMPLED 0-6". PHOTO 1+2

(2)

WILCOX 11/18/96

1105 DGW/JLI COLLECT SED-02 FROM SAND CREEK, WEST OF S. HWY 66 BRIDGE. SOILS ARE SAME AS SED-01. SAMPLED 0-6" PHOTO 3.

1120 DGW/JLI COLLECT SED-03 FROM SAND CREEK EAST OF S. HWY 66 BRIDGE. SOILS ARE SAME AS SED-01/SED-02. 0-6" COLLECTED. OVA NO READINGS ABOVE BACKGROUND IN BREATHING ZONE AND IN HOLE. PHOTO 4. MINIRAM=0.00 NOTED BRICKS/CONST. DEBRIS IN AREA.

1140 DGW/JLI COLLECT SED-04 FROM UNNAMED INTERMITTENT CREEK N. OF REFINERY ROAD. SOILS ARE SAT. BROWN SILTY, GRAVELLY, FINE SAND, POORLY SORTED. SAMPLED 0-6" PHOTO

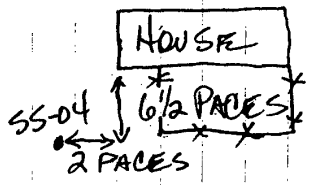
(3)

WILCOX 11/18/96

OVA READINGS=0 IN BREATHING SPACE + HOLE. MINIRAM=0.00

1205 SPEAK TO [redacted] (b) (6) NOTIFY THAT WE ARE TO SAMPLE YARD + CHURCH. SHE GRANTS PERMISSION.

1210 COLLECT SS-04 FROM [redacted] (b) (6)



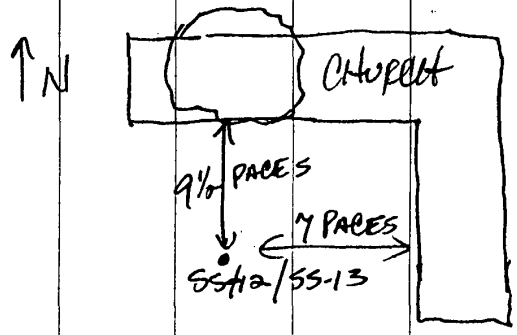
SOILS ARE BROWN FINE SILTY SAND, WET-SAT. SAMPLED 0-6" OVA READINGS ARE ZERO IN BREATHING SPACE + HOLE. ~~OVA~~ DGM MINIRAM = 0.92. PHOTO.

1220 DGW/JLI COLLECT SS-12 8619[redacted] CHURCH PROPERTY

(4)

WILCOX 11/18/96

SOILS ARE BROWN SILTY SAND, WET-MOIST. GRAVEL-SIZE PIECES OF BRICK + CONCRETE PRESENT.



COLLECTED 0-6"
OVA READINGS=0
MINIRAM = 0.00

1225 COLLECT SS-13.
DUPLICATE OF SS-12.

1245 BREAK FOR LUNCH
1245 RETURN TO SITE
GIVE TO (b) (6)
(b) (6) AN
E US ACCESS

(5)

WILCOX 11/18/96

TO PROPERTY (BY UNLOCKING GATES)

1420 DGW/JLI COLLECT SS-06 FROM (b) (6) PROPERTY. STRESSED VEGETATION. OVA READING = 0. MINIRAM = 0.00 + 0.99 UNUSUAL ODOR. BROWN SILTY, CLAYEY SAND, SAT. SAMPLED 0-6".

1520 DGW/JLI COLLECTS ~~SS-0~~ SED-06 FROM SEDIMENTS OF CREEK @ UNNAMED INTERMITTENT CREEK. SILTY, SAND, ORGANIC MATERIALS, SATURATED, BROWN SAMPLE 0-6". OVA READING: 0 MINIRAM 1.77

1530 COLLECTED SED-07 (DUP. SED. 06)

1615 DGW/JLI COLLECT SS-05 FROM (b) (6) RESIDENCE YARD. 6½ PACES FROM

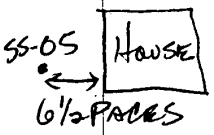
66T9T95

(6)

WILCOX 11/18/96

HOUSE.

↑ N



SOILS ARE DK BRN MST. SILTY SAND, FINE.
SAMPLED 0-6"
OVA = 0.00
MINIRAM = 0.0

1630 RETURN TO TRUCK TO WORK ON CLIPBOARDWORK.

1715 DEPART SITE TO PACK SAMPLES INTULSA.

(7)

WILCOX 11/19/96

0800 TEAM MEETS.
0830 TEAM DEPARTS TULSA FOR SITE.
0930 TEAM ARRIVES AT SITE
0945 DGW/JLI DEPART FOR SUPPLIES.
1000 DGW/JLI RETURN + DROP OFF SUPPLIES
1020 DGW/JLI COLLECT SED-08 FROM SAND CREEK. FINE SAND, SOME SILT, LIGHT BROWN, SAT. 0-6"
1105 JLI/DGW COLLECT SED-09 FROM THE CONFLUENCE OF SAND CREEK + AN UNNAMED INTERMITTENT STREAM THAT DRAINS THE SITE. FINE, LT. BROWN SAND W/SOME SILT, SAT. 0-6". (OBTAINED PERMISSION TO CROSS PASTURE TO CREEK)
1210 DGW/JLI COLLECT SS-01 SOUTH OF SAND CREEK BRIDGE (S. HWY 66) +

001006

(8)

WEST OF S. HWY 666. SOILS ARE DARK BROWN, SANDY SILT, MOIST. 0-6".

1215 DGW/JLI COLLECT SS-02 FROM EAST SIDE OF S. HWY 666 (ACROSS HWY FROM SS-01). DK BRN SANDY SILT, MOIST-WET, 0-6" SS-01 + SS-02 ARE BACKGROUND SAMPLES. ~~SS-02 IS LOCATED DGW~~

1230 DGW/JLI COLLECT SS-03 (BACKGROUND SAMPLE). LOCATED ON A HIGH (TOPOGRAPHIC) APPROX. 50 FT FROM RD. TO McDONALD'S. SOILS ARE REDDISH-BRN SANDY SILT, MOIST TO WET, 0-6"

1245 BREAK FOR LUNCH

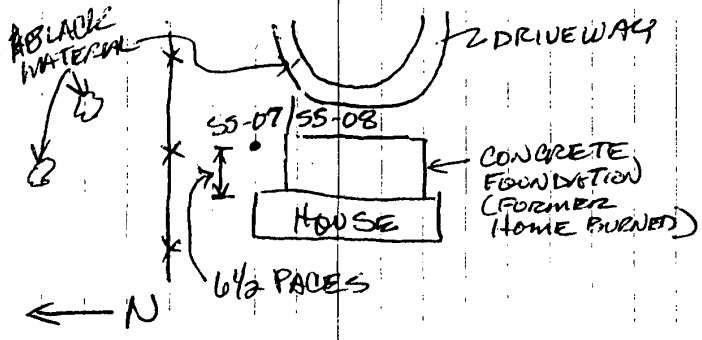
1330 DGW STOPS BY (b) (6) RESTAURANT + DISCUSSES ACCESS.

~~1400~~ DGW

1345 TEAM RETURNED TO SITE.

(9)

1400 DGW/JLI GAIN ACCESS TO (b) (6) RESIDENCE (b) (6) SHOWS US AREAS ~~OF B~~ DGW THAT BLACK MATERIAL HAS SEEPED UP FROM GROUND. LOCATED N. OF HOUSE ~~OF~~ IN FENCED AREA; ALSO COMES UP BETWEEN CRACKS IN DRIVEWAY. MAINLY SEEPS WHEN TEMP. IS HOT.



1405 COLLECT SS-07. SOILS ARE DK. BROWN SANDY SILT, WET. 0-6" NO OVA READINGS ABOVE BACKGROUND ~~OVA~~ DGW

5616201

WILCOX 11/19/96

IN HOLE OR BREATHING SPACE.

1415 COLLECT SS-08. DUP. OF SS-07.

1430 COLLECT SED-05 FROM POND BEHIND RESIDENCE. NOTED BLACK ASPHALT-LOOKING MATERIAL AROUND E. SIDE OF POND. INVESTIGATED AREA FROM (b) (6) PROPERTY DRAINS DIRECTLY INTO HERE. SOILS ARE BROWN FINE SILTY SAND, SAT. 0-6" SMALL INCLUSIONS OF BLACK SAND ON A READINGS = 0. NOTED CHICKENS + HORSES AT (b) (6) RESIDENCE. 3 PEOPLE LIVE AT (b) (6) RESIDENCE.

1535 DGW/JLI COLLECT SED-10 FROM SAND CREEK AT HWY 16 (1ST STREET) SOILS ARE LT. BRN FINE SAND, MST.-WET 0-6"

WILCOX 11/19/96 DGW

1545 RETURN TO SITE + BEGIN CLIP PAPERWORK.

1655 DEPART SITE FOR FEDEX.

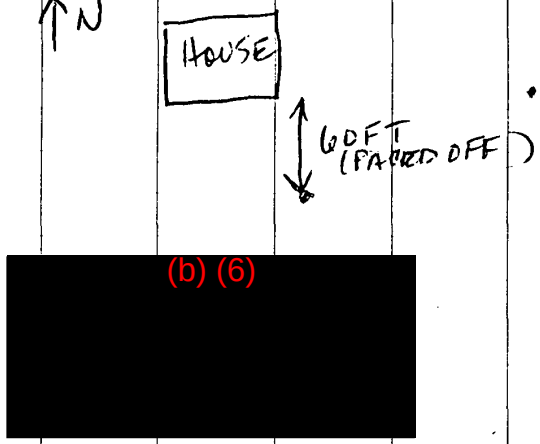
Diane D. Williams

5516202

WILCOX OIL

LATE ENTRY:

1350 PWR ECT COLLECT SS-11 FROM RESIDENCE. SOILS ARE DK BRN. SILTY SAND, MST. 0-6"



11/20/96 WILCOX OIL

0440 TEAM DEPARTS TULSA FOR SITE.

0830 ARRIVE IN BRISTOW STOP FOR ICE.

0845 ARRIVE AT SITE. CALIBRATE MINIRAM. CALIBRATE OVA (95ppm METHANE)

0900 BEGIN STAGING EQUIP.

1000 TGW: JCI collect WS-05 from pit. Berm of pit is breached. OVA reading of waste is 60 units. OVA reading in breathing zone is 60. Waste is oily black sticky. A smell from the pit is noticeable. Looks like waste has leaked out side berm and a sheen occurred.

5616203

(12) (14)

11/20/96 Wilcox 0.1
Trees in the pond have
leaked turned up.
1010 Sample ~~to~~ (12)
WS-06 collected by
DEIW. WS-06 is a
duplicate of
WS-05
1035 Reached another pit,
the one with two
chambers. Berm
of pit has been
breached. There is
a stream next to the
opening.
There is standing water
in the stream and
stream. PHE located
a drainage ditch
adjacent to the berm
with standing water
in it. There is vegetation
but is low brown.
There is sparse
vegetation in the
center of the berm.

(15)

11/20/96 Wilcox 0.1
There is also standing
water in the pit.
1040 WS-04 sample collected
by DEIW
Black-brown, wet ~~sediment~~
Looks charred, like (13)
it's been burned.
OVA reading is zero in
breathing zone.
OVA reading in sample
hole is 1 unit above
background.
MiniRam reading: 0.11
" " 0.07
Pit & pond drain into intermittent
stream. Water is flowing
in it
1105 Pond 2, cell 2, has standing
water. No sheen is seen
on the water.
Trees are growing in the
pond & some shrubs
The stream also flows
back along this pond

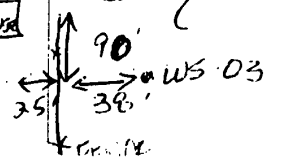
001010

(16) Wilcox Oil 11/20/96
of Pond? Some vegetation
looks burned.
There is evidence of
live stock: foot prints? deer?
There is also evidence of
of beaver chewed
tree.

1115 Sample WS-07 collected
by DGW in tank area.
Metal debris on berm
Rusted metal on ground
DGW decided to not take
the sample at this time
Area seems to be a tank
bottom. DGW unsure if
Gulf coast labs will be
able to analyse sample.
If I observed hoof
prints in the area.
Tall grass growing in
patches in the tank
bottom area.
DGW found a spot to
sample. Located where
berm is breached.

11/20/96 Wilcox Oil
There is an petroliferous
odor.
Where the berm is breached
there is an oily substance,
looks like it was flowing out.
There is also black stuff
outside of the tank area in
the breached area.
OVA reading in breathing zone
is zero above background.
OVA reading in hole is zero
above background.
MiniRam is 0.05 ± 0.03

11:45 BREAK FOR LUNCH
12:30 BUY SUPPLIES, LUNCH & PHONE CALLS
1300 ARRIVE AT (b) (6) RESIDENCE
1310 COLLECT WS-03 FROM SIDE PASTURE. BLACK GOOEY MATERIAL SEEPING FROM GROUND



5616205

(18)

11/20/96 Wilcox Oil

1400 DGW collects WS-08 from loaded tank bottom. PHR notes there is an oily sheen in the standing water in the loaded tank bottom area. Black material. Asphalt looking.
OVA in breathing zone: sample hole is 0 over background.
There is another hole a petroliferous odor.

1420 DGW collects sample WS-01 from ~~pit~~ Pond 1 Berm of pit seems to no exist anymore. Tractor tracks are seen around pit in individual sections of the waste. Standing water in the pit has an oily sheen.
OVA readings from sample hole is greater than 1000 units

(19)

DGW/ Wilcox Oil 11/20/96

Black oily sheen, gooey stick
A slight odor is detected

1480 DGW collects sample WS-02 from Pond 2. Same as WS-02
OVA reading of sample is 0 units above background
Sample is collected from an area of standing water
Substance is like ~~ta~~ taffy (22)

1510 TEAM RETURNS TO TRUCK AND BEGINS PACKING SAMPLES / PREPARING TAGS.

1700 TEAM DEPARTS SITE FOR FEDEX.

Diane D. McClain

5516206

5616207

REFERENCE 3

CROSS - REFERENCE TARGET

DRAWING OUT REFER TO 35MM FILM

ROY WESTON

5616208

5616209

Pull out 2

Box # 75

55:6210

REFERENCE 4

CONSENT FOR ACCESS TO PROPERTY

Name: (b) (6)
(b) (6)
Bristow, OK 74010-9716

EPA I.D. No.: OKD0001010917
Site Name: Wilcox Oil Company
Bristow, Oklahoma

Description of Property: The Wilcox Oil Company site is located in Bristow, Oklahoma (see attached location map).

I hereby consent to officers, employees, and representatives authorized by the United States Environmental Protection Agency (EPA) entering and having continued access to my property for the following purposes:

1. Reviewing and copying documents related to the site;
2. The taking of such soil, water and air samples as may be determined to be necessary;
3. The sampling of any solids or liquids stored or disposed of on property;
4. The drilling of holes and the installation of monitoring wells for subsurface investigation of subsurface contamination.

55.611

I realize that these actions are undertaken pursuant to EPA's response and enforcement responsibilities under the Comprehensive Environmental Responsibility, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9601 et seq., as well as 40 CFR Part 300.400 Subpart E.

I am the property owner, or a responsible agent of the property owner, and I warrant that I have the authority to enter into this access agreement.

Place a check mark in the appropriate space. Please note that if no selection is made EPA will assume that you do not wish to be provided with a portion of the sample.

( ) Please provide me with a portion of each sample taken at the property described above. I understand that there will be no charge for the sample portions provided by the EPA. I also understand that I must furnish suitable containers, be responsible for the laboratory analytical analysis, and sign for the transfer of custody from the EPA designated sampler.

( ) I do not wish to receive a portion of samples taken at the property described above.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any ki

(b) (6)

10/July 1996
DATE

Note: The area marked in red on the site map attached (approx. 10 Ac.) under [redacted] owned by the above signed only.

(b) (6)

arcs:46065621:white2.626(bmm)

CONSENT FOR ACCESS TO PROPERTY

Name: (b) (6) [redacted]

EPA I.D. No.: OKD0001010917
Site Name: Wilcox Oil Company
Bristow, Oklahoma

Description of Property: The Bristow Oil Company site is located in Bristow, Oklahoma (see attached location map).

I hereby consent to officers, employees, and representatives authorized by the United States Environmental Protection Agency (EPA) entering and having continued access to my property for the following purposes:

1. Reviewing and copying documents related to the site;
2. The taking of such soil, water and air samples as may be determined to be necessary;
3. The sampling of any solids or liquids stored or disposed of on property;
4. The drilling of holes and the installation of monitoring wells for subsurface investigation of subsurface contamination.

I realize that these actions are undertaken pursuant to EPA's response and enforcement responsibilities under the Comprehensive Environmental Responsibility, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9601 et seq., as well as 40 CFR Part 300.400 Subpart E.

I am the property owner, or a responsible agent of the property owner, and I warrant that I have the authority to enter into this access agreement.

Place a check mark in the appropriate space. Please note that if no selection is made EPA will assume that you do not wish to be provided with a portion of the sample.

( ) Please provide me with a portion of each sample taken at the property described above. I understand that there will be no charge for the sample portions provided by the EPA. I also understand that I must furnish suitable containers, be responsible for the laboratory analytical analysis, and sign for the transfer of custody from the EPA designated sampler.

( ) I do not wish to receive a portion of samples taken at the property described above.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

(b) (6) [redacted]

10 July 96
DATE

Note: See attached Site Map of Area in Red

area:4600237:white.626(bmm)

CONSENT FOR ACCESS TO PROPERTY

Name: (b) (6)

EPA I.D. No.: OKD000010917
Site Name: Wilcox Oil Company
Bristow, Oklahoma

Description of Property: The Wilcox Oil Company site is located in Bristow, Oklahoma. The site includes portions of the NW 1/4 of the NW 1/4 and the NW 1/4 of the NE 1/4 of Section 29, Township 16 North, Range 9 East (see attached map).

I hereby consent to officers, employees, and representatives authorized by the United States Environmental Protection Agency (EPA) entering and having continued access to my property for the following purposes:

1. Reviewing and copying documents related to the site;
2. The taking of such soil, water and air samples as may be determined to be necessary;
3. The sampling of any solids or liquids stored or disposed of on property;
4. The drilling of holes and the installation of monitoring wells for subsurface investigation of subsurface contamination (if determined necessary to perform).

55.613

I realize that these actions are undertaken pursuant to EPA's response and enforcement responsibilities under the Comprehensive Environmental Responsibility, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9601 et seq., as well as 40 CFR Part 300.400 Subpart E.

I am the property owner, or a responsible agent of the property owner, and I warrant that I have the authority to enter into this access agreement.

Place a check mark in the appropriate space. Please note that if no selection is made EPA will assume that you do not wish to be provided with a portion of the sample.

( ) Please provide me with a portion of each sample taken at the property described above. I understand that there will be no charge for the sample portions provided by the EPA. I also understand that I must furnish suitable containers, be responsible for the laboratory analytical analysis, and sign for the transfer of custody from the EPA designated sampler.

(✓) I do not wish to receive a portion of samples taken at the property described above.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

(b) (6)

10-24-96
DATE

nrcx:\40\05021:clas.021

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

1445 ROSS AVENUE, SUITE 1200

DALLAS, TEXAS 75202-2733

RECEIPT FOR SAMPLES

11/19/96
(Date)

DIANE G. WILLIAMS Diane G. Williams
(Name & Title of EPA Representative) (Signature)

DESCRIPTION OF SAMPLES COLLECTED

5516 4

Sample Number	Time	Place Collected	Type	Volume	Split Sample Required	Split Sample Provided
SS-07	1405	FRONT YARD	SOIL	2-8oz, 2-4oz.	—	—
SS-08	1415	FRONT YARD	SOIL	" "	—	—
SED-05	1430	POND	SEDIMENT	" "	—	—

Acknowledgement of Property Representatives

The undersigned acknowledges that the samples described above have been collected.

(b) (6)
Name & Title of Property Representative)

(b) (6)

(b) (6)
Address of Property Representative)

11-19-96
(Date)

BRISTOW, OK 74010

DISTRIBUTION: One copy to Property Representative
One copy to Inspector's Record
Original to Regional Office (6ASA8C)

area:46032722:sample1.frm

CONSENT FOR ACCESS TO PROPERTY

Name: (b) (6)

EPA I.D. No.: OKD0001010917
Site Name: Wilcox Oil Company
Bristow, Oklahoma

Description of Property: The Wilcox Oil Company site is located in Bristow, Oklahoma (see attached location map).

I hereby consent to officers, employees, and representatives authorized by the United States Environmental Protection Agency (EPA) entering and having continued access to my property for the following purposes:

1. Reviewing and copying documents related to the site;
2. The taking of such soil, water and air samples as may be determined to be necessary;
3. The sampling of any solids or liquids stored or disposed of on property;
4. The drilling of holes and the installation of monitoring wells for subsurface investigation of subsurface contamination.

55161C

I realize that these actions are undertaken pursuant to EPA's response and enforcement responsibilities under the Comprehensive Environmental Responsibility, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9601 et seq., as well as 40 CFR Part 300.400 Subpart E.

I am the property owner, or a responsible agent of the property owner, and I warrant that I have the authority to enter into this access agreement.

Place a check mark in the appropriate space. Please note that if no selection is made EPA will assume that you do not wish to be provided with a portion of the sample.

( ) Please provide me with a portion of each sample taken at the property described above. I understand that there will be no charge for the sample portions provided by the EPA. I also understand that I must furnish suitable containers, be responsible for the laboratory analytical analysis, and sign for the transfer of custody from the EPA designated sampler.

(X) I do not wish to receive a portion of samples taken at the property described above.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

July 8, 1996
DATE

(b) (6)

area:4640X621:sample.626(lanai)

56.6216

REFERENCE 5

WESTON
PHONE CONVERSATION RECORD

ORIGINATOR

Diane G. Williams

X ORIGINATOR RECEIVED CALL

_ ORIGINATOR PLACED CALL

CONVERSATION WITH: **DATE:** 01/17/97

NAME: Hal Cantwell
Hazardous Waste Division
Oklahoma Department of Environmental Quality (ODEQ)

TIME: 11:00

PHONE: (405) 271-7158 **W.O. NO.:** 04606-056-026-0600

SUBJECT: Wilcox Oil Company

NOTES: Mr. Cantwell called to inquire whether we had sample results back for Wilcox Oil. He stated that they had determined that Wilcox Oil never conducted operations west of the railroad tracks. He also indicated that the State was pursuing the property west of the railroad tracks (where the First Assembly of God Church and Pastor (b) (6) residence currently exist) as a separate site. Their information shows that this property (and properties north of the old Refinery Road) was once operated as a refining facility by the Lorraine Refinery. Mr. Cantwell also indicated that they are investigating old refineries north of the Wilcox site as separate sites, as well.

FILE: 04606056026

TICKLE FILE:

FOLLOW-UP-BY:

COPY/ROUTE TO:

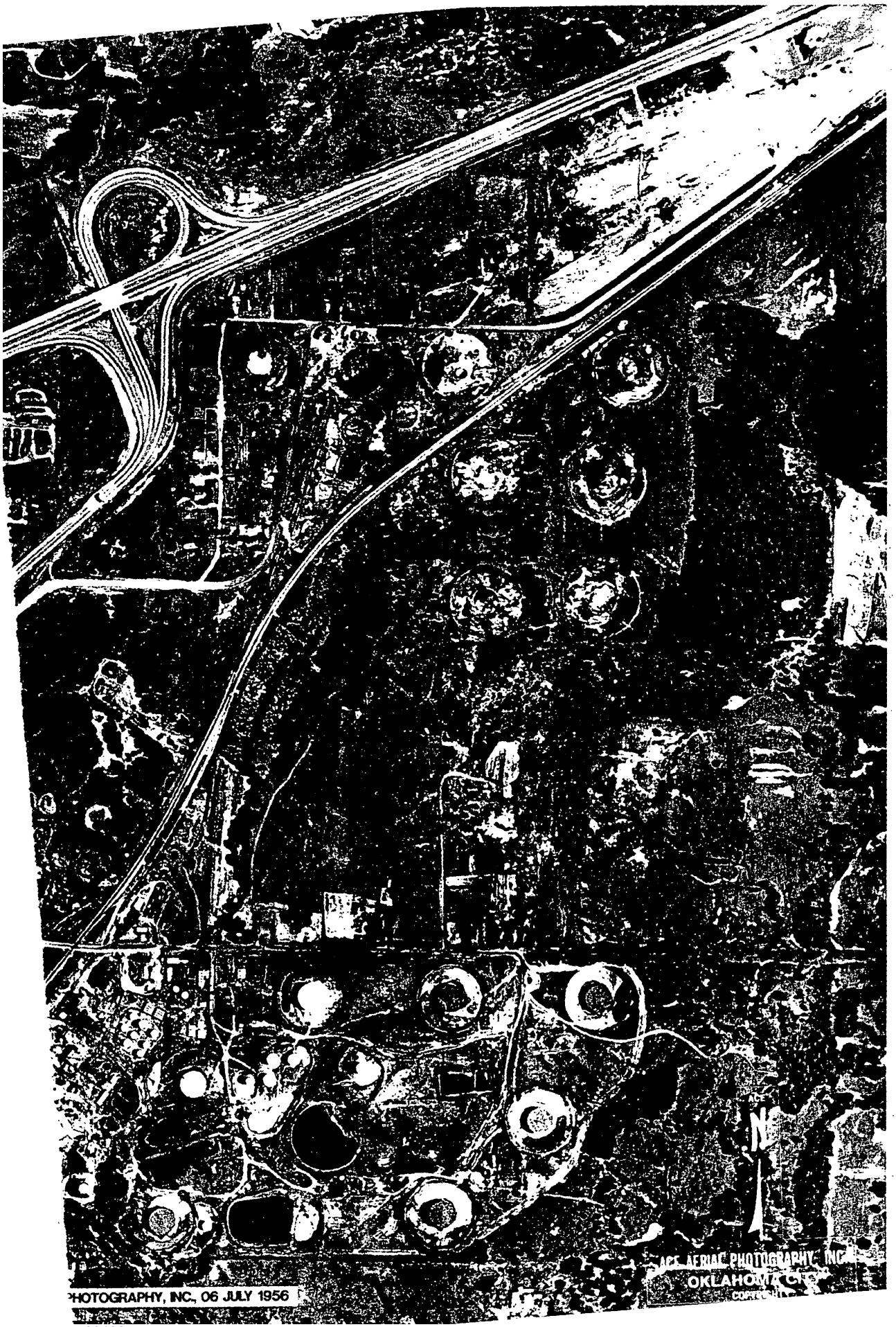
FOLLOW-UP-ACTION:

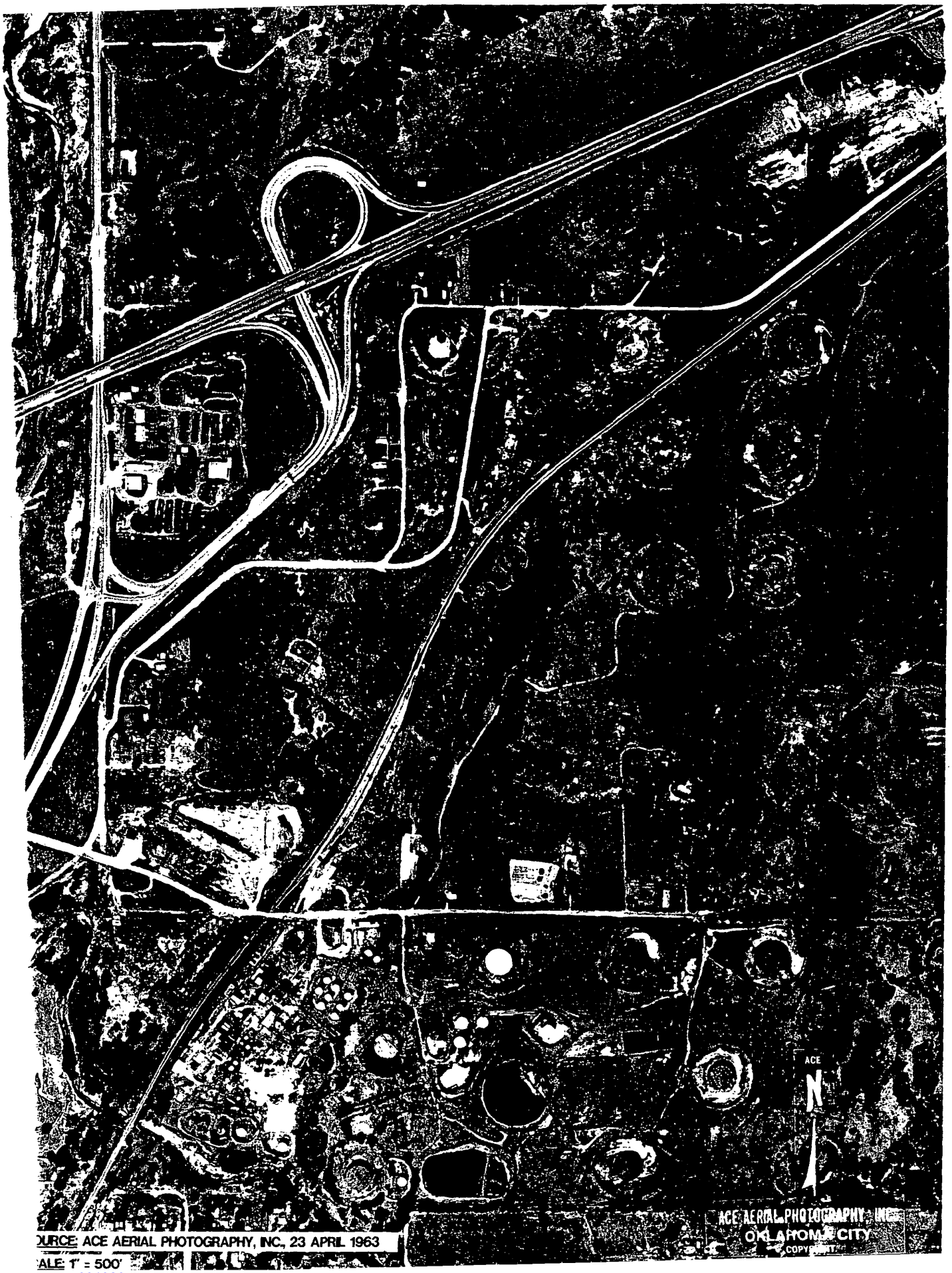
53,618

REFERENCE 6

001024




PHOTOGRAPHY, INC., 06 JULY 1956
ACE AERIAL PHOTOGRAPHY, INC.
OKLAHOMA CITY



OURCE: ACE AERIAL PHOTOGRAPHY, INC., 23 APRIL 1963

ALE: 1" = 500'



SOURCE: ACE AERIAL PHOTOGRAPHY, INC., 25 MARCH 1976

SCALE: 1" = 500'

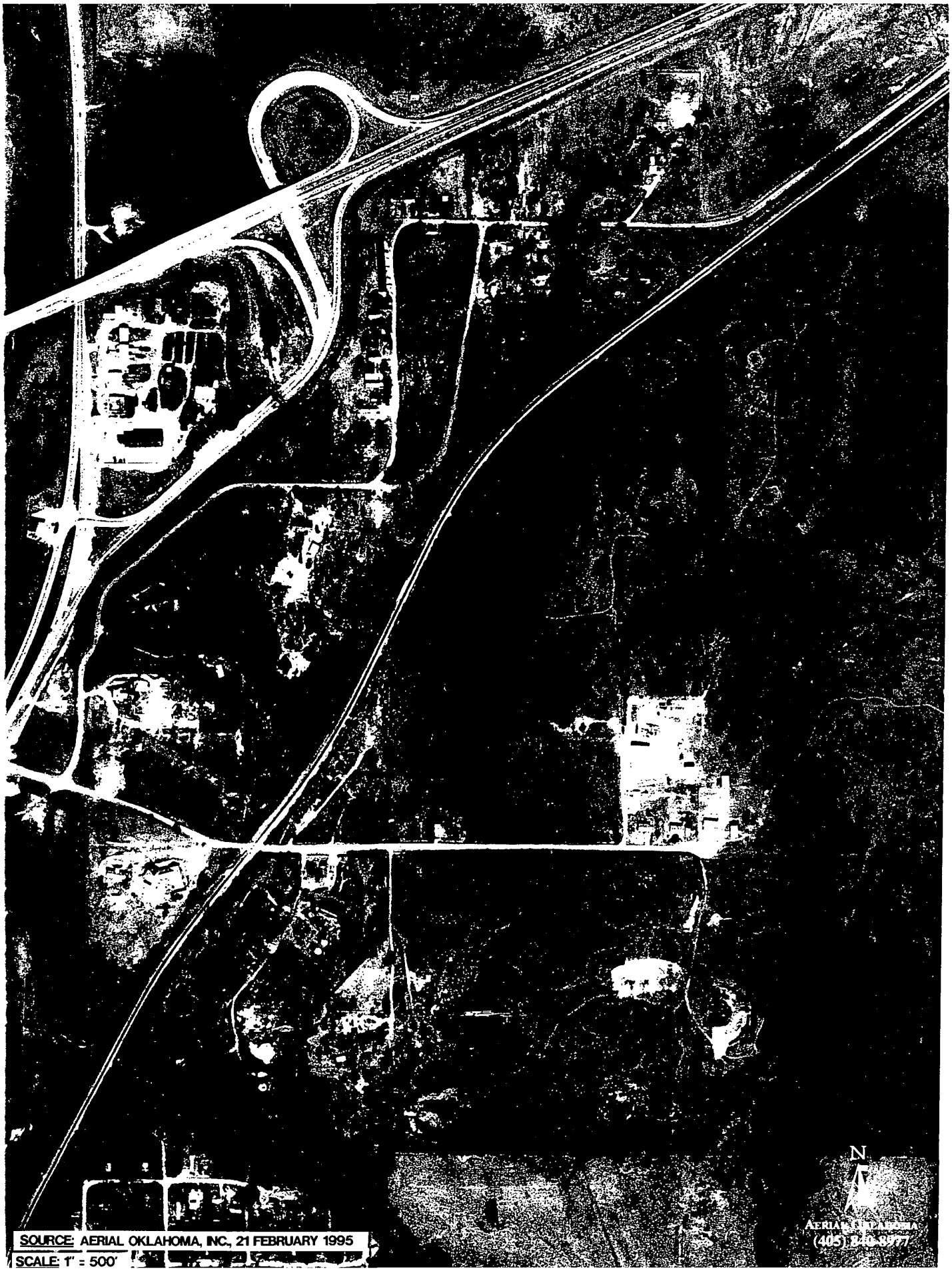


SOURCE: ACE AERIAL PHOTOGRAPHY, INC., 13 JUNE 1985

SCALE: 1" = 500'

5616224

REFERENCE 7


N
SOURCE: AERIAL OKLAHOMA, INC., 21 FEBRUARY 1995
SCALE: 1" = 500'
AERIAL OKLAHOMA
(405)

Ex. 6526

REFERENCE 8

A Gulf Publishing Company Publication

THE REFINER
and Natural Gasoline Manufacturer

Member Audit Bureau of Circulations

VOL. 9, No. 9 — SEPTEMBER, 1930

GRADY TRIPLETT, Editor — GEORGE REID, Associate Editor

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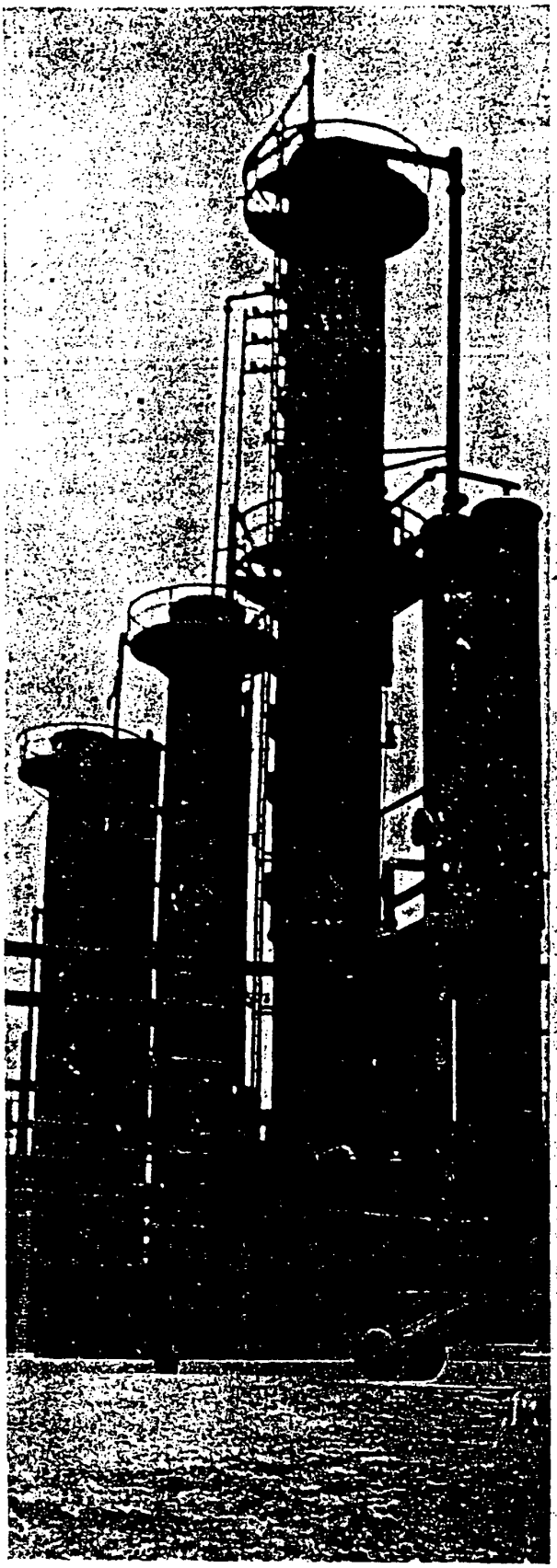
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001032

Wilcox Has Installation Plant

561622



WILCOX OIL & GAS COMPANY has been operating its new refinery at Bristow, Okla., a little more than a year, during which time certain additions and changes have been made to secure products not originally required and to generally improve efficiency. The refinery is on the same site as the original 1000-barrel Wilcox experimental plant erected 10 years ago, which was operated under lease by Riley Petroleum Company in 1928, and which was completely dismantled to permit erection of the new 4000-barrel modern skimming-cracking plant. Decision to erect and operate a refinery follows entry of the company into wholesale and retail marketing and subsequent expansion of these facilities in territory within a radius of 300 miles of the refinery. Like most modern installations of the type this plant consists of skimming plant, cracking unit, and redistillation battery, with vapor recovery system and continuous treating equipment.

The greater portion of the 4000-barrel crude requirements of the refinery is produced locally by the company, and as soon as it is practical the crude is brought direct to the plant from the field, thus eliminating expensive storage and handling facilities. However, this practice is conducive to relatively high percentages of b. s. & w. in the crude, which must be settled out before actual processing at high temperature. This is accomplished by means of preheating the fresh crude in a series of Cloverleaf sections

Fractionating equipment in connection with crude topping unit and pressure distillate re-run stills.

001033

Ha Modern
ion Bristow
lan

By GEORGE REID
Associate Editor

placed
Y ha in the uppermost section of the skimming unit
tow, C fractionating column where the oil is preheated to
which 200° F.
n- ma
ndit this point the crude passes into one end of
is ht by 24 foot horizontal settling drum (for-
merly having seen years of service as a shell still)
ox o where the settling time is sufficient to let the foreign
wa materials drop out of the oil. Clean crude is drawn
pan continuously from the front and top of the drum, and
l to & w. is continuously removed from the front
skim bottom of the settler.
rate The crude is then further preheated through coun-
wh through a series of exchangers, absorbing
ana from the residum leaving the base of the sepa-
us fractionating
column. The temperature is raised to about
F. before it enters the pipe still. This Winkler-
Koch
distillation unit consists of 124 tubes 3½
I. D. and 22 feet long, arranged in two con-
vection
banks and one roof bank. As the oil leaves
the tubes it has been heated to about 520° F. and
its temperature it enters the bottom of the large
fractionating column.

The column was designed by the same engineering
firm, and is six feet in diameter by 75 feet high.
It contains 17 bubble decks and two blank decks,
one of which is approximately half way up the height
of the tower from which point a kerosene side stream
oil is removed; the other blank deck being just
below the top three bubble trays where a side stream
gasoline is removed. Former design called for

By means of this conveyor coke dropping from the reaction chamber is loaded directly into cars for shipment.



001034

removal of a kerosene side stream into a flashing or stripper tower, and withdrawal of residuum through a similar flash tower, flashing both with superheated steam, and returning flashed vapors to the original column. Under the present practice the upper auxiliary tower or side stream produces a stream of 437 e. p. naphtha, and a 375 e. p. gasoline stream is taken off over head. Gas oil may be removed from the lower withdrawal equipment, and fuel oil is taken from the bottom. Condensed 375 e. p. gasoline is taken from a large water separator device and returned over the top of the column as a means of temperature control. This control is also aided by passing the incoming crude through the coils in the top of the tower. Residue is pumped from the tower by liquid level control into raw oil tanks for the Dubbs unit.

This change in design and in the number and type of products fractionated through the large bubble column is an example of the flexibility of modern rectifying equipment. With slight mechanical changes the operation of the tower may at any time be converted back to the original system or to meet some other requirements. The two grades of gasoline produced in this operation are given sodium plumbite treatment in a continuous treating system to meet Doctor and corrosion specifications.

CRACKING OPERATION

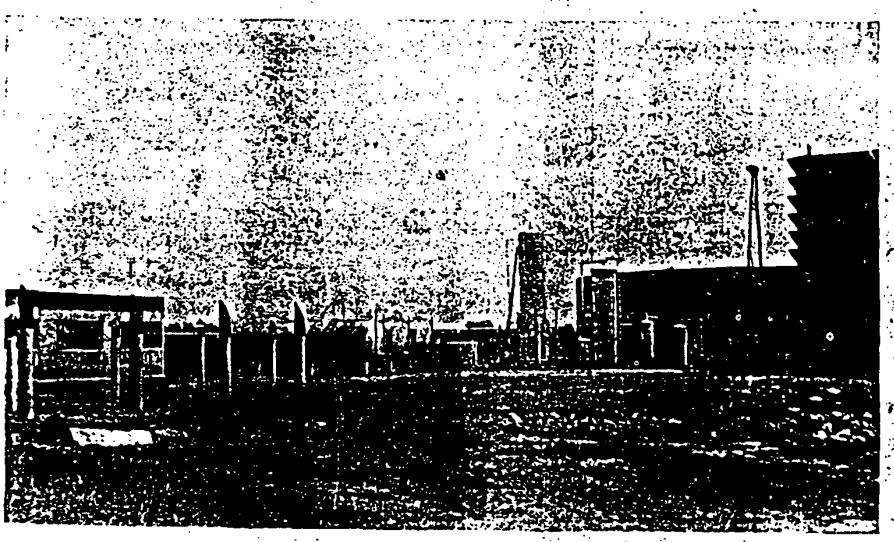
The Dubbs cracking unit is equipped with a 10 by 40 foot reaction chamber and late type modified Alcorn radiant heat furnace. Several changes in design were effected in this furnace and its operation. Special alloy beams have been installed to support the radiant shield getting the weight off of the tubes, the arch was removed, the number of tubes was reduced to 64 and the flow of oil was reversed. These changes and other details were worked out by Dubbs, Alcorn and Wilcox engineers, due to the new design of the furnace. The unit is operated in three day cycle running non-residuum. At present the production of topped crude is in excess of the capacity of the single Dubbs unit, and the company is considering the installation of additional cracking equipment.

Through the use of equipment designed for direct loading of coke into cars the coke production is handled but once at this plant. A spur track was built close to the reaction chamber from the nearby railroad. A conveyor with a hopper large enough to fit under the reaction chamber, is employed to dump the coke directly into the cars. As the 4300-foot cable is pulled from the chamber by means of a steam hoist, the electrically operated conveyor removes the falling coke, free of nuts, bolts, dirt and other foreign matter, spilling it into the cars. It is estimated that this conveyor has reduced the cost of handling coke about one dollar per ton, and as seven to eight hundred tons are handled monthly and sold on contract to a large industrial concern, there is real economy effected in this method of handling the product.

Pressure distillate from the cracking operation is taken to the treating department and treated with four pounds of 66° Be. acid per barrel and neutralized with 17° Be. caustic in a continuous system. The distillate is then taken to rerun stills. This system consists of two 12 by 30 foot shell stills equipped with bubble towers. Incoming 50 gravity pressure distillate is charged through Cloverleaf sections placed in the tops of the two bubble towers. After this preheating it enters the shell stills. Through the addition of a new stripper tower in connection with the second bubble tower, the rerun system is producing a fraction of stripped furnace oil of about 34 gravity. The bottoms are marketed as 28/30 gravity fuel oil. Overhead stream from the fractionating equipment is a premium grade 400 end point anti-knock motor fuel and marketed as such. A side stream of 425 end point gasoline is removed which is blended with the straight run gasoline.

Cracked gasoline from the rerun operation is given Doctor treatment in a continuous system. The straight run gasolines are given similar treatment. Two complete continuous

(Continued on page 122)



Compression gasoline recovery plant and gas washing equipment

001035

to guard against loss of desirable fractions. Both the raw gasoline and reflux feeds is regulated by Foxboro controllers, the usual orifice arrangement being maintained.

The re-boiler and column temperatures are maintained within one-half of one degree of the desired temperature, the success of the stabilization depending largely upon this small deviation from the ideal temperature. The pressure on the stabilizing column is maintained within one-half pound of the desired pressure.

The regulator is on the water condensate from the re-boiler. Boiler pressure is maintained on the re-boiler, while the desired temperature is maintained by a half-inch regulator installed on the water condensate leaving the re-boiler. When the valve is closed, water covers the tube section, and when the valve is opened, water leaves the tower, allowing steam to cover the tube section and thereby increasing the temperature.

Liberal use of concrete for supporting such equipment as the heat exchangers and condensers add strength to the installation and reduces the fire hazard. Elimination of buckling from steel platforms is also accomplished, in addition to a more attractive appearance. The ladder leading up the main column is enclosed by a barrel of heavy wire netting—an added safety factor for workmen.

Five large DeLaval centrifugal pumps are used for circulating water and moving the gasoline, two being for the former and three for the latter. All pumps are in a pit below the surface of the ground. The pump house is equipped with blowers to prevent accumulation of dangerous fumes.

The unit was designed and built by C. F. Braun and Company; actual arrangement of the equipment being largely in the hands of company engineers. Besides handling an almost unprecedented gallonage, the unit is one of the most attractive installations yet completed.

Wilcox Has Modern Installation in Bristow Plant

(*Continued from page 74*)

treating systems are provided for handling the light products, and agitators of the batch type were erected for kerosene treatment.

A recent addition at this plant is a compression type gasoline recovery installation for which gases and vapors are gathered from the skimming plant receiving house, the redistillation plant receiving house, light product storage and crude tanks. Yields from these vapors run from two to six gallons per 1000 cubic feet. The plant production ranges from 4000 to 5000 gallons per day. Gases from the Dubbs unit operation are to be processed through an absorption type recovery unit planned for early installation. Vapors from the pressure distillate reruns operation are first scrubbed through alkaline solution before they are compressed.

The compression plant consists of four 80-horsepower Bessemer machines operating at 40 pounds on the low stage side and 175 pounds on the high stage side.



Cracking equipment at Wilcox Oil & Gas Company's Bristow, Oklahoma, refinery

Early in the construction of the new refinery P. L. Tinkler joined the organization as construction engineer. He supervised the installation and design of facilities, and upon completion of the plant was made superintendent of its operation, and has directed the modifications and additions to the plant as discussed in this writing. We are indebted to Mr. Tinkler for his helpfulness and his permission to present the details of plant operations.

001036

5616232

REFERENCE 9

WESTON
PHONE CONVERSATION RECORD

ORIGINATOR

Diane G. Williams

_ ORIGINATOR RECEIVED CALL

X ORIGINATOR PLACED CALL

CONVERSATION WITH:

DATE: 07/31/96

NAME: (b) (6)
Property owner
Wilcox Oil Company Site

TIME: 15:00

5616233

PHONE: (b) (6)

W.O. NO.: 04606-056-026-0600

SUBJECT: Wilcox Oil Company

NOTES: (b) (6) indicated that his son and daughter-in-law, (b) (6) live in the house located at the former Wilcox Oil refinery. He asked that we check in with her before accessing their property.

FILE: 04606056026

TICKLE FILE:

FOLLOW-UP-BY:

COPY/ROUTE TO:

FOLLOW-UP-ACTION:

5616234

REFERENCE 10

POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

REGION	SITE NUMBER
VI	

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
Wilcox Oil Co.	North of Bristow		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Bristow	OK		Creek

G. OWNER/OPERATOR (if known)

1. NAME	2. TELEPHONE NUMBER
unknown	

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE ☒ 6. UNKNOWN

I. SITE DESCRIPTION

The site is located in a mostly rural area and is bordered by a residential area to the east and the south, an active railroad track to the west, and a county road to the north. The site appears as a fenced, inactive oil-related facility containing tanks and oil-related equipment in various states of disrepair. There are some barren spots on the site, and several waste piles were visible.

50516235

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)	K. DATE IDENTIFIED (mo., day, & yr.)
State Program	6-7-94

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

Wilcox Oil Co. operated an oil-related facility at this site, and refinery related wastes may be on site. Currently, the contents of the on-site containers are unknown. Integrity of these containers is uncertain. As a result, a potential for release of hazardous substances may exists on the site.

M. PREPARER INFORMATION 1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Karen Khalafian, Environmental Specialist	(405)271-7137	6/7/94

EPA Form 2070-8 (5-80)

001040

5616236

REFERENCE 11

TARGET SHEET

SITE NAME: WILCOX OIL COMPANY

CERCLIS I.D.: OK0001010917

TITLE OF DOC.: EXPANDED SITE INSPECTION

DATE OF DOC.: 03/01/1997

NO. OF PGS THIS TARGET SHEET REPLACES: 4

SDMS #: 9011565 **KEYWORD:** 10.06

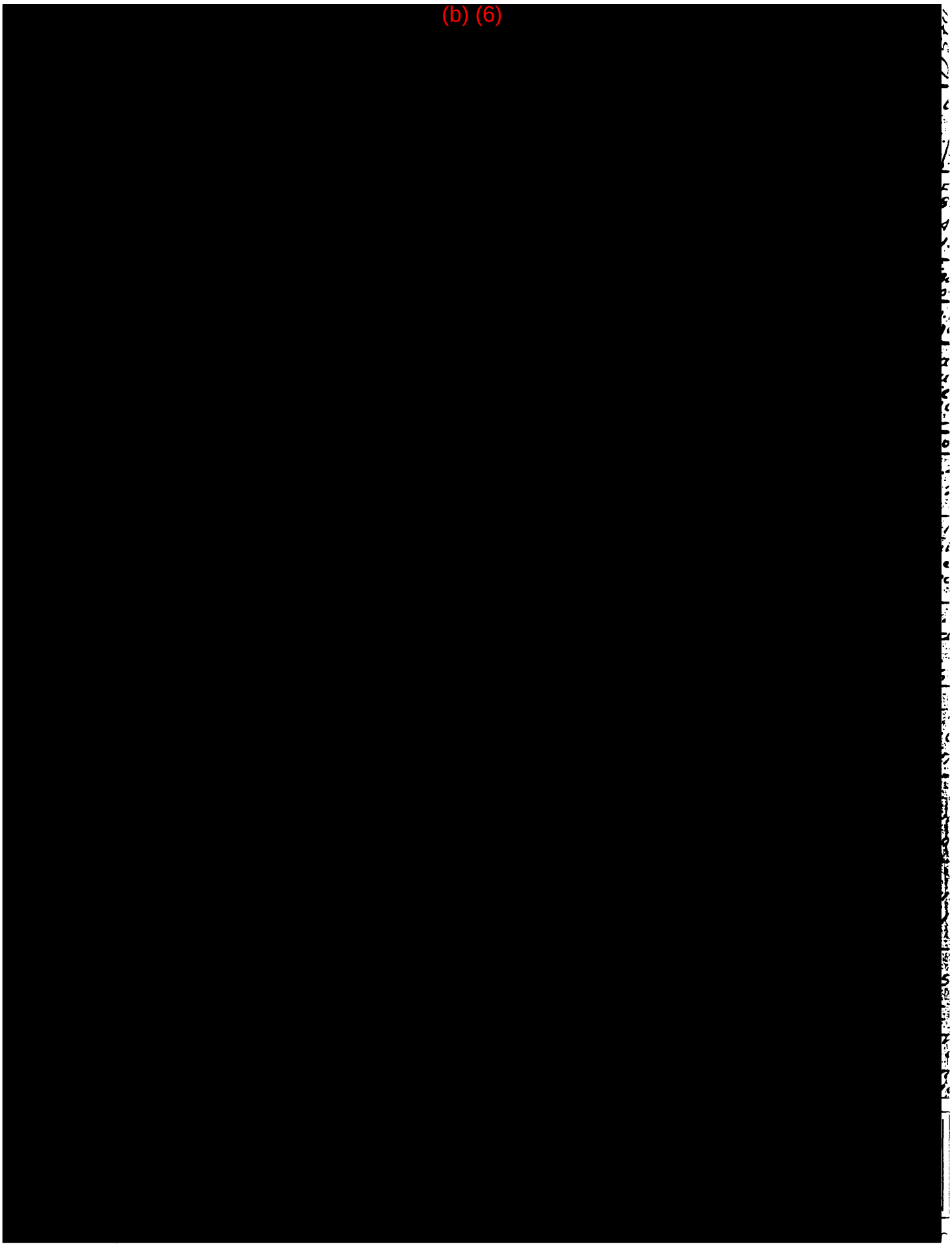
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ALTERN. MEDIA ?		**CROSS REFERENCE ?**	

LAB DOCUMENT ?		**LAB NAME:**	
ASC./BOX #:		**RAW ANALYT. DATA ?**	
CASE #:		**SDG #:**	

COMMENTS : Reference 11 (bates 5616237-5616240) is missing from this document.

5616241

REFERENCE 12


(b) (6)

5616243

REFERENCE 13

MEMORANDUM

November 8, 1994

To: Rita Kottke (Senior Environmental Specialist), Waste Management Division, Site Assessment Unit.

From: David Cates (Environmental Specialist), Waste Management Division, Site Assessment Unit.

Re: Hydrogeology and Ground Water Use. **Site:** Wilcox Oil Company Refinery. **Location:** Bristow (NE/4 NW/4 NW/4 of Section 29, Township 16 North, Range 9 East of Creek County, Oklahoma).

5616244

Regional Hydrogeology

Principal ground water resources in Creek County, as mapped by Johnson (1983), include alluvial and terrace deposits where present throughout the county and the Pennsylvanian age Vamoosa-Ada aquifer in the west. The alluvial and terrace deposits are unconsolidated while the Vamoosa-Ada is considered a bedrock aquifer. Older Pennsylvanian rocks, including the Barnsdall Formation, produce ground water for municipal, domestic and industrial supplies in the central and eastern part of the county.

Quaternary age alluvial aquifers are the youngest in Creek County. Alluvial deposits are wedge shaped layers of sand, silt, clay, and gravel found along the Deep Fork and Cimarron Rivers and their major tributaries. Sediment is continually being eroded, reworked, and redeposited by the rivers and streams. Alluvial deposits range from 0 to 100 feet in thickness for the Deep Fork and Cimarron Rivers, and less for minor streams (Oakes, 1959).

Terrace deposits were formed when ancient streams deposited alluvium consisting mostly of sand, silt, clay, and gravel. Since the ancient streams were the ancestors of the Deep Fork and Cimarron Rivers, terrace deposits are located adjacent to these present-day rivers and streams, but at higher elevations. Like the younger alluvium, the composition and thickness of terrace deposits can vary greatly over short lateral distances.

Water suitable for domestic purposes can be found in the alluvial and terrace aquifers. Ground water in these aquifers is usually found under unconfined (water table) conditions and is susceptible to contamination from surface sources. Alluvial and terrace sediments are moderately permeable and wells yield about 25 to 50 gallons of water per minute (gpm) (Bingham and Moore, 1983).

Underlying the alluvial and terrace deposits in Creek County is bedrock assigned to the Virgilian and Missourian Series of the Pennsylvanian age. These strata outcrop at the surface with the progressively younger beds exposed to the west. The Pennsylvanian strata strike north-south and regional dip is westerly about 30 to 90 feet/mile (Oakes, 1959). However, east dips are encountered around surface folds and faults.

Most of the surface faults in Creek County trend northwest to southeast. They are several miles long with up to 100 feet of vertical displacement which decreases with depth (D'Lugosz et al., 1986). Larger subsurface faults trending northeast to southwest exist at depth but have no direct influence on the near surface ground water hydrology except possibly in the very eastern part of the county. The surface faults, however, may retard ground water flow or provide conduits for rapid recharge depending on the degree of fracturing, brecciation and shearing of the near surface rocks along the fault zones.

The Vamoosa-Ada aquifer consists of, in ascending order, the uppermost part of the Barnsdall Formation, the Tallant Formation. the Vamoosa Formation, the Ada Group and the lower part of the Vanoss Group. The Vamoosa Formation and the Ada Group make up the bulk of the aquifer. The Vamoosa-Ada strata outcrop in the western one third to one half of Creek County and are predominantly composed of red and brown coarse to fine grain well sorted sandstones interbedded with dark red sandy to silty shale. Individual sandstone beds range in thickness from 5 to 60 feet and tend to be either thick and lenticular or thin with large lateral extent. Chert conglomerates and coarse grained sandstones are present near the base of the Vamoosa Formation in the southern part of the county. Oakes (1959) reported that sandstone percentage, bed thickness, and grain size tend to decrease to the north. The thickness for the aquifer ranges between 200 in the south to between 500 and 800 feet elsewhere (Johnson, 1983).

Because of their resistance to weathering the sandstones form east facing escarpments which are a few miles long or, in some cases, extend across the county. The intervening valleys are underlain by silty sandstones and shales. The land is covered by grasses, scrubby blackjack and oak trees.

Ground water under unconfined conditions exists in the outcrop area of the aquifer and for a short distance west of the point where the aquifer is overlain by less permeable rocks. However, confined conditions generally exist at depth even under the outcrop areas because of the presence of shale beds. The occurrence and movement of ground water is controlled by regional and local geologic structures, lateral and vertical distribution of sandstone and shale units, and the physical character of the rocks. The physical characteristics also control the hydraulic properties of the aquifer and are directly related to sedimentary source and depositional environment.

The average hydraulic conductivity for the Vamoosa-Ada aquifer is 3 ft/day based on well test data and an average value for storage coefficient for the confined part of the aquifer is 0.0002 (D'Lugosz et al., 1986). Specific yield for the unconfined part of the aquifer was estimated by D'Lugosz et al. (1986) to be a value of 0.12 and specific capacities for gun perforated wells were reported to be about 1 (gal/min)/ft of drawdown. Wells commonly yield 25 to 150 gpm; and some may yield as high as 300 gpm locally (Johnson, 1983). Water wells in the Vamoosa-Ada are from 30 to 750 feet deep (Bingham and Moore, 1975).

Water from the Vamoosa-Ada aquifer is of generally good quality, ranging in total dissolved solids (TDS) concentrations between 200 to 1,000 milligrams per liter (mg/l) (Johnson, 1983). Ground water composition tends to be dominated by sodium, calcium, and bicarbonate (D'Lugosz et al., 1986). However, sodium, sulfate, and chloride may constitute high proportions in places.

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Underlying the Vamoosa Formation are the rocks of the Missourian Series which consist of, in descending order, the Ochelata Group and the Skiatook Group. The strata of the Ochelata Group (in descending order) are the Tallant, Barnsdall, Wann, Iola and Chanute Formations. The rocks of the Skiatook Group consist of (in descending order) the Dewey, Nellie Bly, Hogshooter, Coffeyville, Checkerboard and Seminole Formations. These formations outcrop successively from west to east in the eastern two thirds to one half of the county.

The lithology of these strata is similar to that of the Vamoosa, being composed of resistant sandstone beds and clayey, silty, sandy shale. The sandstone beds tend to be coarse grained, conglomeratic and massive in the south. In the north sandstone units contain thin beds of fine to medium grained sandstone which are interbedded with silty and sandy shale; the shale content being greater in this direction. The Missourian Series strata contain several limestone formations and some coal beds. The shale, limestone and coal beds in the Pennsylvanian section affect ground water by acting as confining beds (aquitards).

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In contrast to the Vamoosa-Ada aquifer, none of the older rocks are identified as principal bedrock aquifers (Johnson, 1983). However, wells yield 25 to 50 gpm at depths from 20 to 200 feet from these formations. The quality of ground water is more variable, with some generally good quality water produced just east of the Vamoosa-Ada (TDS of 150 to 500 mg/l) and fair to poor water (650 to 50,000 mg/l TDS) produced in the eastern one third of the county (Bingham and Moore, 1975). The composition of the fresh ground water tends to be mainly made up of calcium, magnesium and bicarbonate but indications of contamination are evidenced by water with large TDS concentrations of which sodium, sulfate and chloride constitute major proportions (Morton, 1986).

Ground water is found at shallow depths in Creek County, usually within 25 feet of ground surface. However, deeper wells may be required to obtain producible quantities of ground water. The base of fresh water (i.e., water containing less than 1,000 mg/l TDS) is encountered at depths of 200 to 500 feet below ground level in the eastern part of Creek County, but is found at depths of 500 to 1,000 feet in the west (Bingham and Moore, 1983). Areas with a deep zone of fresh water tend to be correlated with thick sandstone accumulations (D'Lugosz et al., 1986). Below fresh water is a zone of brackish water followed by brines at greater depths. These deep formation brines constitute a large potential source of contamination of fresh ground water as a result of oil-field activities (Morton, 1986).

The regional ground water flow direction is from west to east as is surface drainage. However, locally the shallow ground water flows in various directions to points of discharge into surface water bodies, such as rivers, creeks, lakes, and ponds. Impacted ground water discharging into a creek may serve as source of surface water pollution.

Almost all recharge to ground water comes from downward infiltration of precipitation that falls on the land surface. However, most of the precipitation is lost to evapotranspiration and surface runoff, thus only about 4 to 10 % reaches the zone of saturation (D'Lugosz et al., 1986). Recharge to the Pennsylvanian aquifers occurs where the formations outcrop. This constitutes a large area in Creek County. Most recharge to ground water occurs during the winter months when evapotranspiration is low.

The shallow subsurface soils and rocks of Creek County have not been reported to be prone to solution cavities. Although high sulfate values in ground water from the Pennsylvanian rocks may be attributed to gypsum dissolution, sink holes have not been reported in the area. Furthermore, a review of the United States Geological Survey topographic map for the site does not show geomorphology of karst terrain. However, clays of outcropping Pennsylvanian rocks are prone to formation of desiccation cracks during dry periods. Also, zones of highly fractured rock may exist near surface faults.

Site Hydrogeology and Ground Water Use

The Barnsdall Formation outcrops under the Wilcox Oil Company Refinery site. The Barnsdall Formation is heterogeneous in character containing sandstone beds collectively known as the Okesa Sandstone Member which are interbedded with silty and sandy shales. Alluvial deposits of the Sand and Little Deep Fork Creeks are present to the south of the site. The site has been spotted on the following reference material: A) Geologic Map of Creek County (Oakes, 1959); B) Maps Showing Principal Ground Water Resources and Recharge Areas in Oklahoma (Johnson, 1983); and C) Geologic Map of the Oklahoma City Quadrangle, (Bingham and Moore, 1975). These maps indicate that the Vamoosa Formation outcrops about one mile to the west of the site. However, the site is shown to be within the potential recharge area for the Vamoosa-Ada aquifer (Johnson, 1983).

The Barnsdall Formation is the principal source of ground water to the eight active municipal water supply wells of Bristow, Oklahoma according to published records. These wells are located within 2 miles west of the site. One of the wells is located about one quarter mile southwest of the site in the NE/4 SE/4 NE/4 of section 30-T16N-R9E. This well, City of Bristow #7, has been capped and is not active at this time. However, it is capable of producing if re-entered according to Danny Trout of the Bristow Department of Public Works. Ground water from the Barnsdall Formation is produced from a domestic well located within one quarter mile north of the site in the SW/4 SW/4 SW/4 of section 20-T16N-R9E. The OWRB Multipurpose Water Well report for this well indicates that it was drilled in 6/2/83 to a depth of 230 feet. Another municipal water supply well was drilled in the center of section 29-T16N-R9E to a depth of 200 feet; but this well has been plugged and abandoned. It is located within one half mile southeast of the site and its production history is unknown.

The shallow ground water system near the site is found in upper weathered bedrock zones and alluvial deposits at depths less than 20 feet in nearby domestic wells. The shallow ground water system is under unconfined (water table) conditions and flow at the site is probably toward the south to southeast, discharging into Sand Creek nearby or the Deep Fork located about 3 miles farther south of the site (professional judgement). Ground water in the Barnsdall Formation is probably under confined conditions at depth due to the presence of shale beds within the formation. The deep ground water may be influenced by pumping from Bristow's water wells and the domestic well cited above; thus the flow direction may be to the southwest, west or north depending on the extent of well pumpage at any specific time.

The shallow aquifer at the site is predominantly composed of sandstone and shale which is

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weathered near the ground surface, and is probably not in direct hydraulic connection with the deeper parts of the underlying aquifer in the Barnsdall Formation. Based on professional judgement, contaminants in the shallow soil or ground water environments at the site could migrate to the adjacent alluvial aquifers or the shallow portions of the underlying Barnsdall aquifer. Also, improperly constructed water wells and oil wells in the vicinity could serve as direct conduits for migration of potential contaminants to the aquifers. In fact, as indicated on the Herdon map (which is included in the reference material), there are two abandoned oil-exploration wells located within one quarter mile southeast of the site. It is unlikely, however, that contaminants at the site could reach the Vamoosa-Ada aquifer since it outcrops west of the site and overland flow is locally to the south and southeast. Also, a shale section 30 to 60 feet in thickness within the Tallant Formation may act as a protective barrier against contamination of the Vamoosa-Ada aquifer from below.

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References

Bingham R. and Moore R., 1975, Hydrologic Atlas 4, "Reconnaissance of the Water Resources of the Oklahoma City Quadrangle Central Oklahoma", Oklahoma Geological Survey.

D'Lugosz, J.J., McClaflin, R.G., and Marcher, M.V., 1986, "Geohydrology of the Vamoosa-Ada Aquifer East-Central Oklahoma", Oklahoma Geological Survey Circular #87.

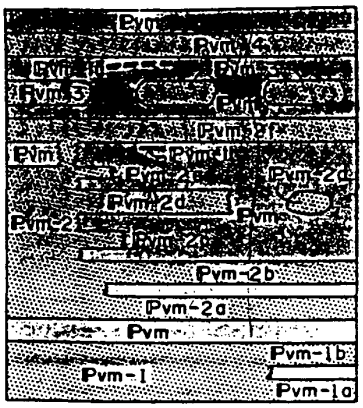
Johnson, K., 1983, "Maps Showing Principal Ground-Water Resources and Recharge Areas in Oklahoma", Oklahoma State Department of Health, Complied by Kenneth S. Johnson, Oklahoma Geological Survey, 1983.

Morton, R.B., 1986, "Effects of Brine on the Chemical Quality of Water in Parts of Creek, Lincoln, Okfuskee, Payne, Pottawatomie, and Seminole Counties, Oklahoma", Oklahoma Geological Survey Circular #89.

Oakes, M.C., 1959, "Geology and Mineral Resources of Creek County, Oklahoma", Oklahoma Geological Survey Bulletin #81.

PENNSYLVANIAN SYSTEM — VI

MISSOURI SERIES — OCHELATA GROUP



VAMOOSA FORMATION

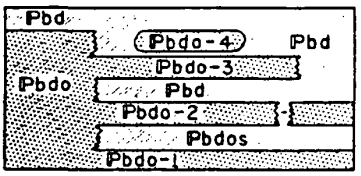
(Resistant sandstone units [Pvm-1, 2, 3, 4] interbedded and intergrading with nonresistant sandstone and sandy, silty shale [Pvm]. In upper part are two sandy limestone beds [Pvm-ll] and [Pvm-lu]. Mapped sandstone units consist of closely related lenses approximately but not strictly in a constant stratigraphic interval.)

unconformity



TALLANT FORMATION

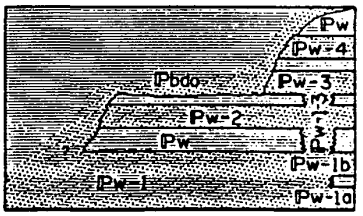
(Lower sandstone member [Ptl-1] containing shale lens [Ptl-1a], and upper shale member [Ptl-2] containing a few thin sandstones.)



BARNSDALL FORMATION

(Unnamed shale member [Pbd] and Okesa sandstone member [Pbdo]. South of Little Deep Fork Creek the Okesa may include representatives of the lower part of the Wann formation. North of Little Deep Fork Creek the Okesa consists of mappable sandstones [Pbdo-1, 2, 3, 4] and shale [Pbdos] as indicated. The top of the Okesa is not everywhere the same bed.)

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WANN FORMATION

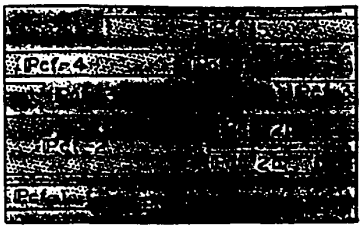
(Sandstone units [Pw-1, 2, 3, 4] and intervening units of sandy shale [Pw]. Overlain unconformably by Okesa sandstone member of Barnsdall formation [Pbdo]. Remnants of the basal part of the Wann present south of Little Deep Fork Creek, if any, are mapped with the Okesa.)

PENNSYLVANIAN — MISSOURI — SKIATOOK GROUP

DES MOINES SERIES — MARMATON GROUP

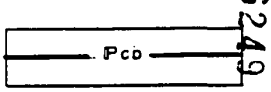
(Nellie Bly formation: Shale, sandstone, and sparse stone. The lower shale unit [Pnb-1] bifurcates southwa contains a sandstone lens [Pnb-1]. Sandstone unit P composed of resistant and nonresistant sandstone a tremely sandy shale; bases of resistant ledges within u indicated by black lines. The middle shale unit Pnb- tains four mapped sandstone lenses [Pnb-3], not pr equivalent. Sandstone unit Pnb-4 contains local sandy stone beds. The upper shale unit Pnb-u contains two m calcareous sandstone lenses [Pnb-5], not precisely equi and one mapped sandy limestone bed Pnb-ls.

Hogshooter formation Ph: Represented by gray sandy stone and calcareous sandstone which crop out from p place in shale above sandstones of the Coffeyville for and below sandstones of the Nellie Bly formation.



COFFEYVILLE FORMATION

(Units Pcf-l, u are composed of silty, sandy shale. Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone nonresistant sandstone, and extremely sandy, silty Bases of resistant ledges within units are indicated by lines. Neither top nor base of any sandstone unit is th bed throughout.)



CHECKERBOARD LIMESTONE

(A single massive bed of dark blue fossiliferous lim generally about 2.5 feet thick.)



SEMINOLE FORMATION

(Sandstone and shale, undifferentiated. Contains also thin impure fossiliferous limestone lenses of local occur Dawson coal shown by a single heavy dashed black l

unconformity



HOLDENVILLE SHALE

(Dominantly dark gray shale. Only the upper few fee out in Creek County, southeast of Mounds.)

U / D — Fault
Dotted where concealed;
U. upthrown side
D. downthrown side

Quarry

66 — U. S. highway

16 — State highway

Paved road

Improved road

Unimproved road, trail

Railroad

Abandoned Railroad

Electric Railway

WILLIAMS & HEINTZ LITHOGRAPH CORPORAT

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EXPLANATION

Qal

ALLUVIUM

. silt, and clay on flood plains of present streams.)

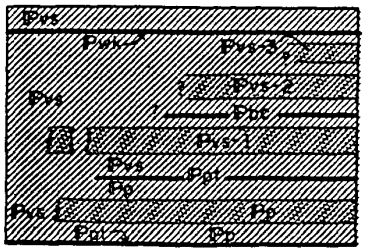
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Qt

TERRACE DEPOSITS

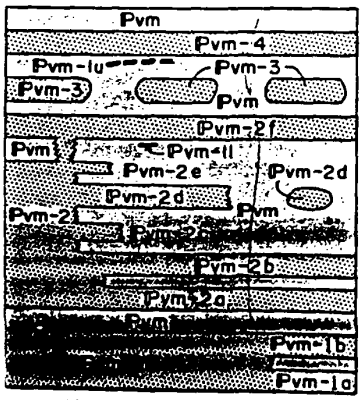
. silt, and clay deposited by ancient streams. Includes some eolian deposits.)

unconformity



VANOSS FORMATION (LOWER PART)
AND
PAWHUSKA FORMATION

s formation: Gray to red shale [Pvs] and sandstones 2, 3]. Intergrades laterally with the Pawhuska forma- d interfingers with the Bird Creek limestone [Pbc]. tains Wakarusa limestone [Pwk] in upper part. ka formation: Turkey Run limestone member [Ppt] at and Lecompton limestone member [Ppl] at the base, d by one or more sandstones and two or more shales [Pp].)



VAMOOSA FORMATION

d sandstone units [Pvm-1, 2, 3, 4] interbedded and ing with nonresistant sandstone and sandy, silty vm]. In upper part are two sandy limestone beds and [Pvm-lu]. Mapped sandstone units consist of lated lenses approximately but not strictly in a constant stratigraphic interval.)

unconformity



TALLANT FORMATION

andstone member [Ptl-1] containing shale lens and upper shale member [Ptl-2] containing a few thin sandstones.)

SYSTEM: PENNSYLVANIAN
SERIES: MISSOURI
GROUP: SKIATOOK
GROUP: OCHELATA

Pi

IOLA FORMATION

(Sandy limestone, calcareous siltstone, fossiliferous sandstone, and shale. In Creek County the boundaries are indefinite and in part gradational.)



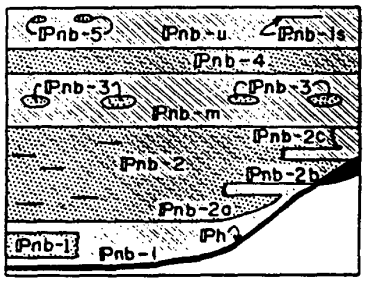
CHANUTE FORMATION

(Sandstone [Pch-1] and shale [Pch-2].)

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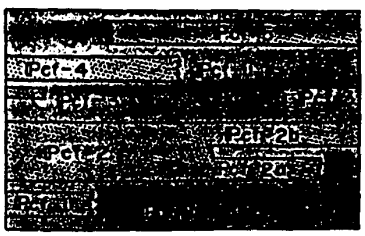
DEWEY FORMATION

(Lower part sandstone, upper part shale. Contains a few local thin sandy limestone beds.)



NELLIE BLY FORMATION
AND
HOGSHOOTER FORMATION

(Nellie Bly formation: Shale, sandstone, and sparse limestone. The lower shale unit [Pnb-1] bifurcates southward and contains a sandstone lens [Pnb-1]. Sandstone unit Pnb-2 is composed of resistant and nonresistant sandstone and extremely sandy shale; bases of resistant ledges within the unit indicated by black lines. The middle shale unit Pnb-m contains four mapped sandstone lenses [Pnb-3], not precisely equivalent. Sandstone unit Pnb-4 contains local sandy limestone beds. The upper shale unit Pnb-u contains two mapped calcareous sandstone lenses [Pnb-5], not precisely equivalent, and one mapped sandy limestone bed Pnb-ls.
Hogshooter formation Ph: Represented by gray sandy limestone and calcareous sandstone which crop out from place to place in shale above sandstones of the Coffeyville formation and below sandstones of the Nellie Bly formation.)



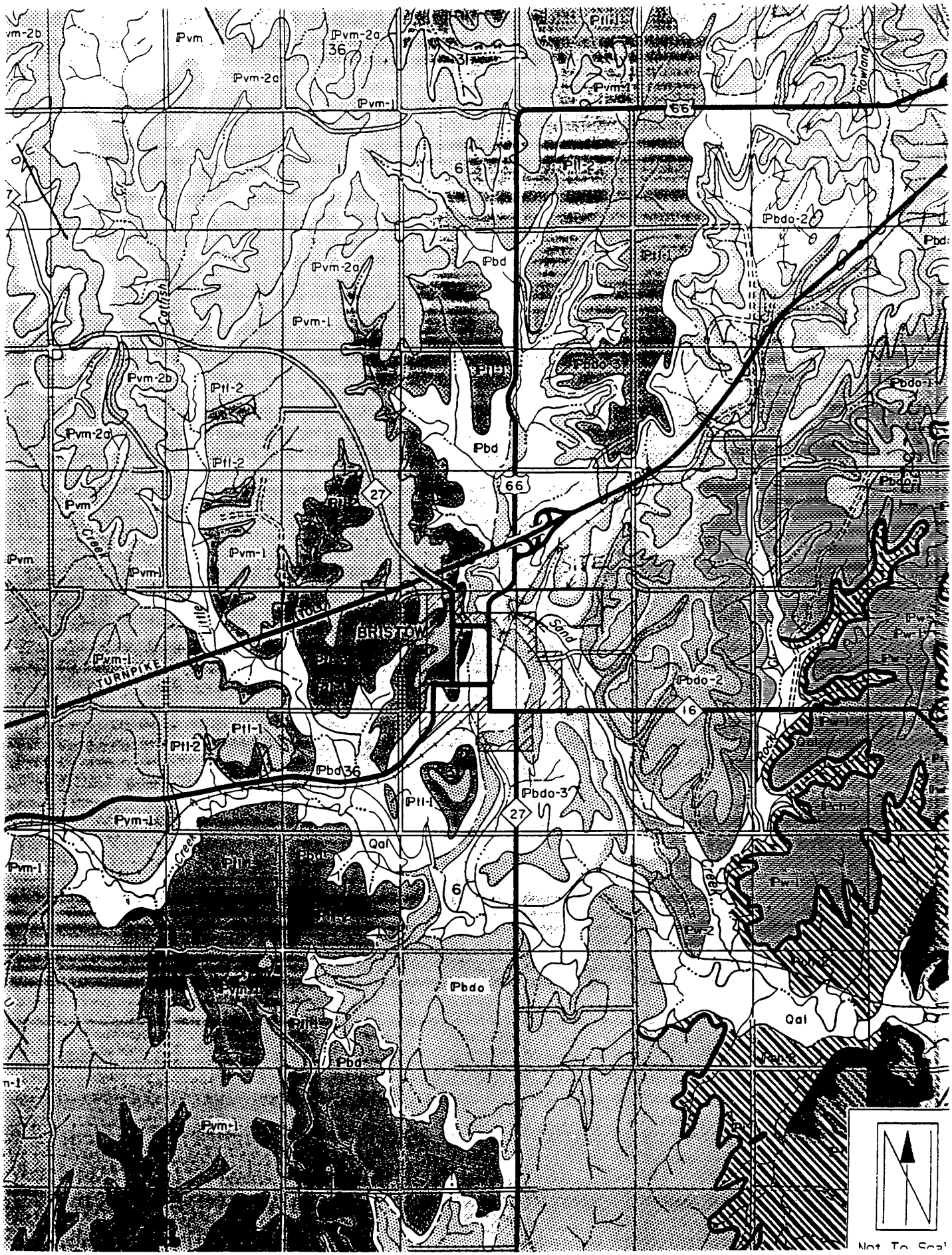
COFFEYVILLE FORMATION

(Units Pcf-1, u are composed of silty, sandy shale. Units Pcf 1, 2, 3, 4, 5 are composed of resistant sandstone lenses, nonresistant sandstone, and extremely sandy, silty shale. Bases of resistant ledges within units are indicated by black lines. Neither top nor base of any sandstone unit is the same bed throughout.)

Pch

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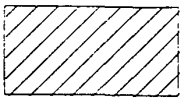

Pvm
Pvm-2a
Pvm-1
Pvm-2b
Pll-2
Pll-1
Pbd
Pbdo-2
Pbdo-3
Pbdo-1
Pbdo
Qal
Pw-1
Pw-2
BRISTOW
TURNPIKE
Sand
Rock
Creek
Catfish
Rowland
66
27
16
36
6

Not To Scale

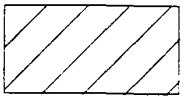
EXPLANATION

RECHARGE AREAS

Patterns of red lines on the map show known or potential recharge areas for the various bedrock aquifers.



Recharge Areas. This pattern shows areas that are known to be part of the recharge area for a bedrock aquifer: includes outcrops of the aquifer and of overlying porous and permeable rocks hydraulically connected with the aquifer.



Potential Recharge Areas. This pattern shows areas that may be part of the recharge area for a bedrock aquifer: includes areas where confining strata may contain pathways for downward movement of water to the aquifer, and safety zones (generally extending 4 miles beyond the known limits of the aquifer) that may overlie unknown extensions of the aquifer or rocks hydraulically connected with the aquifer.

5516 25

BEDROCK AQUIFERS

Colored areas on the map show distribution of bedrock aquifers, which are the rock units generally considered favorable or moderately favorable for development of ground-water resources. Bedrock aquifers are listed below by geologic age from oldest to youngest. References, listed at the end of each aquifer description, include Hydrologic Atlases (HA) and Other Reports that provide more detailed information. All references are given in the 4-page pamphlet that accompanies this map.

Og

Ogallala Formation (Tertiary in age). Loosely cemented layers of fine- to medium-grained sand, silt, clay, and gravel in western Oklahoma and Panhandle; locally contains thin beds of caliche. Thickness generally ranges from 100 to 700 ft. in Panhandle and 100 to 400 ft. elsewhere. Wells commonly yield 25 to 1,500 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all areas where Ogallala crops out or is covered by younger porous and permeable sediments. References: HA-5, HA-8, HA-250, HA-373, HA-450; also Other Reports 12, 13, 17, 21, 22, 23, 24, 25, 26, 28, 30, 31, 32, 33, 40, 42, 43, 52, 54, 55, 61, 66.

An

Antlers Sandstone (Cretaceous in age). Loosely cemented fine-grained sand and sandstone with some layers of shale and clay in southeastern Oklahoma. The aquifer includes underlying Holly Creek Formation in T. 6 S., Rs. 24-27 E., of eastern McCurtain County. Antlers aquifer typically ranges from 200 to 700 ft. thick. Wells commonly yield 10 to 50 gpm, but in some areas they may yield up to 400 gpm. The water is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Antlers Sandstone and overlying Goodland Limestone; potential recharge areas include areas where aquifer underlies younger Cretaceous strata in the south. References: HA-3, HA-9; also Other Reports 9, 20, 33, 61.

El

Elk City Sandstone (Permian in age). Fine-grained sandstone with minor amounts of silt and clay in southwestern Oklahoma. Maximum thickness is about 185 ft. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally less than 500 mg/L dissolved solids). Recharge areas include all outcrops of Elk City Sandstone. References: HA-5; also Other Reports 33, 47, 61.

RM

Rush Springs Sandstone and Marlow Formation (Permian in age). Fine-grained sandstone with some layers of gypsum, shale, and dolomite in western Oklahoma. The amount of shale increases in Dewey County and farther north. Thickness of aquifer ranges from 400 ft. in the south to 200 ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.

Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured and cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 100 to 2,500

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in Dewey County and farther north. Thickness of aquifer ranges from [illegible] ft. in the north. Wells commonly yield 25 to 300 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids), although in some areas of Dewey County and farther north the water locally is of fair to poor quality (1,500 to 4,000 mg/L dissolved solids). Recharge areas include Rush Springs and Marlow outcrops and extend to limits of outcrop on south and east; recharge areas also include outcrops of gypsum and other rocks of overlying Cloud Chief Formation in parts of Caddo, Custer, and Washita Counties. Potential recharge areas in the west extend 4 miles beyond the western limit of the aquifer. References: HA-3, HA-5, HA-6, HA-8; also Other Reports 6, 7, 15, 19, 33, 41, 46, 50, 53, 61, 64, 69.

BD

Blaine and Dog Creek Formations (Permian in age). Gypsum and dolomite layers (locally fractured or cavernous) interbedded with shale in southwestern Oklahoma. The total thickness of the aquifer (the lower part of the Dog Creek Formation and the entire Blaine Formation) is about 250 ft. Wells commonly yield 300 to 2,500 gpm of water that is of fair to poor quality (generally 1,500 to 6,000 mg/L dissolved solids). Recharge areas are outcrops of Blaine, Dog Creek, Rush Springs, and Marlow Formations that overlie the aquifer. Potential recharge areas include other outcrops of Rush Springs, Marlow, Dog Creek, and Blaine strata that dip toward the aquifer. References: HA-5, HA-6; also Other Reports 33, 56, 61, 62.

Ce

Cedar Hills Sandstone (Permian in age). Fine-grained sandstone interbedded with layers of siltstone and shale in northwestern Oklahoma. Thickness typically is about 180 ft. Wells commonly yield 150 to 300 gpm of water that is of good to poor quality (generally 500 to 3,000 mg/L dissolved solids). Recharge areas include Cedar Hills outcrops and extend to limits of outcrop on east; potential recharge areas in south and west extend 4 miles beyond the limits of aquifer. References: HA-7, HA-8; also Other Reports 15, 57, 63.

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GW

Garber Sandstone and Wellington Formation (Permian in age). Fine-grained sandstone irregularly interbedded with shale and siltstone in central Oklahoma; grades into shale to north and south. Thickness of aquifer ranges from about 300 ft. in the south to about 800 ft. in the north. Wells commonly yield 25 to 400 gpm of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas consist of outcrops of the aquifer and extend eastward to the approximate top of shales that make up much of the lower one-third of the Wellington Formation. Potential recharge areas include areas in the west where aquifer underlies younger Permian strata; also areas that extend 4 miles south, west, and north of aquifer limits. References: HA-4; also Other Reports 4, 5, 29, 33, 61, 67, 68.

Os-a

Oscar Group (Early Permian or Late Pennsylvanian in age). Area designated a consists of fine-grained sandstone interbedded with shale and siltstone in central Oklahoma; contains some conglomerate in the south. Main part of aquifer is in lower half of Oscar Group; upper half of Oscar is predominantly shale. Thickness of aquifer ranges from about 150 ft. in south to 300 ft. in north. Wells commonly yield 25 to 50 gpm of water that is of good quality (generally 300 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of Oscar Group; also included are outcrops of shales and sandstones in lower part of overlying Wellington Formation that appear to be hydraulically connected with either the Oscar or the Garber-Wellington aquifer. Potential recharge areas extend 4 miles north, east, and south of aquifer limits. References: HA-4.

Os-b

Oscar Group (Early Permian or Late Pennsylvanian in age). Areas designated b consist of interbedded sandstones and shales in south-central Oklahoma. Total thickness is 300 to 500 ft. Wells commonly yield 50 to 180 gpm of water that is of good to fair quality (generally 500 to 1,500 mg/L dissolved solids). The Oscar Group does not crop out where it is an aquifer, and thus its recharge area is uncertain. Potential recharge areas include, and extend 4 miles beyond, the known limits of the aquifer. References: HA-3, HA-6; also Other Reports 33, 61.

VA

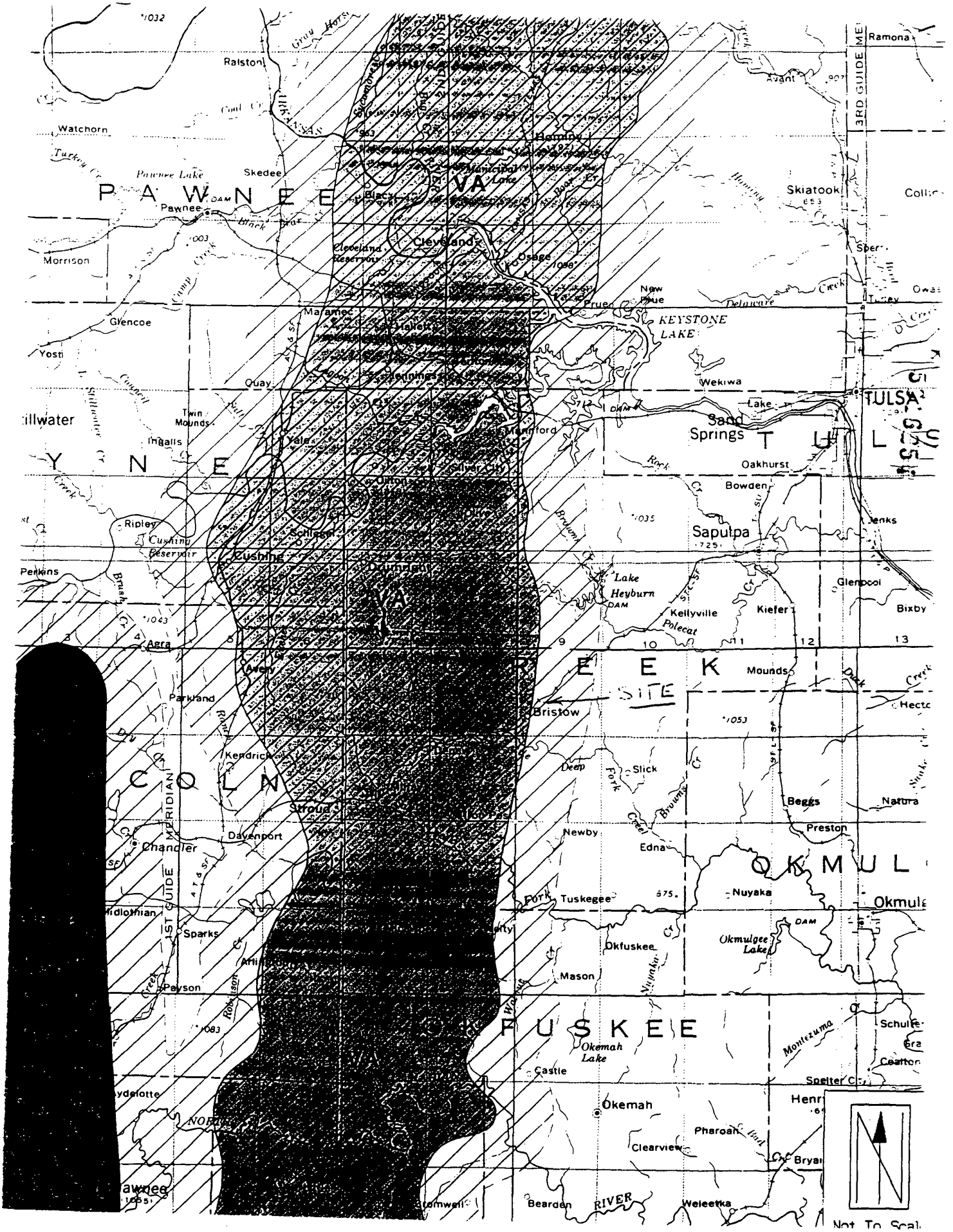
Vamoosa Formation and Ada Group (Pennsylvanian in age). Fine- to coarse-grained sandstone interbedded with shale and siltstone in central and northern Oklahoma; contains some conglomerate in the south. Mapped aquifer locally includes sandstones and shales of overlying Vanoss Group that are hydraulically connected with Vamoosa-Ada aquifer. Boundaries of aquifer shown here represent maximum extent reported on HA-4 and HA-7, or by D'Lugosz, McClaflin, and Marcher (1981). Thickness of aquifer ranges from about 200 ft. in the south to about 500 to 800 ft. elsewhere. Wells commonly yield 25 to 150 gpm, and locally yield as much as 300 gpm, of water that is of good quality (generally 200 to 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and, locally, some hydraulically connected rocks. Potential recharge areas extend 4 miles beyond the aquifer limits. References: HA-3, HA-4, HA-7; also Other Reports 3, 10, 11, 14, 15, 33, 38, 61.

[illegible]

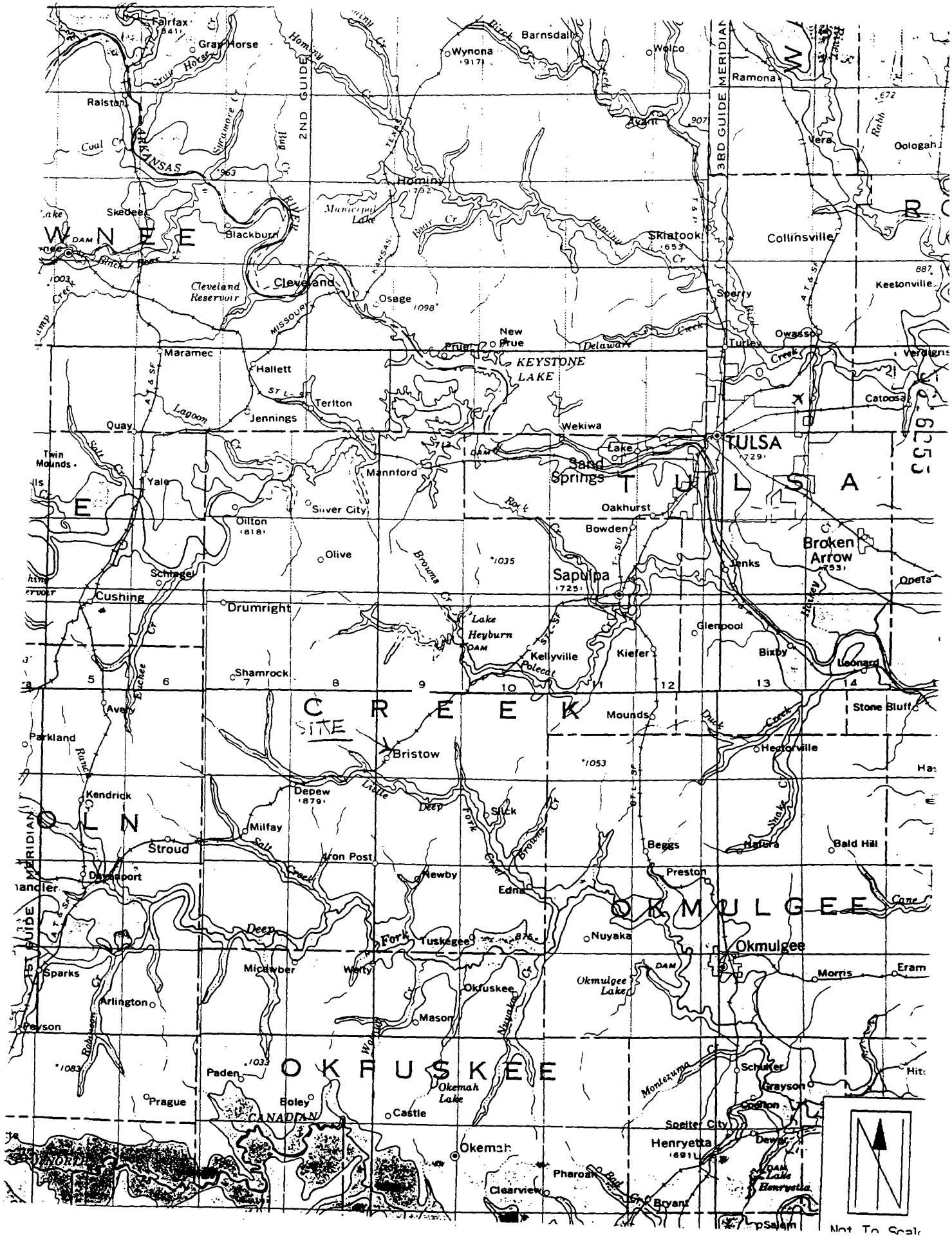
Noxie Sandstone (Pennsylvanian in age). Coarse-grained sandstone with some shale layers in northeastern Oklahoma. Thickness ranges from about 50 to 100 ft. Wells commonly yield 10 to 50 gpm of water that is of good quality (generally less than 1,000 mg/L dissolved solids). Recharge areas include outcrops of aquifer and overlying sandstones and shales of Chanute Formation. Potential recharge areas include areas in west where aquifer underlies younger Pennsylvanian rocks; also areas that extend 4 miles south of aquifer limits. References: HA-2; also Other Reports 14, 33, 38.

KR

Keokuk and Reeds Spring Formations (Mississippian in age). This northeastern Oklahoma unit, also referred to as the "Boone Formation" or "Boone Chert," consists of limestone and cherty limestone beds that locally are fractured or cavernous. Thickness ranges from 250 ft. in south to


Ralston
Watchorn
Pawnee Lake
Skedee
PAWNEE
Pawnee
Morrison
Glencoe
Yosti
Quay
Twin Mounds
Ingalls
Ripley
Cushing Reservoir
Cushing
Perkins
Agra
Parkland
Kendrick
Stroud
Davenport
Chandler
Sparks
Payson
Lydelotte
Mannford
Yale
Silver City
Oilton
Schlegel
Drumright
Avery
Bristow
Slick
Deep Fork
Beggs
Natura
Preston
Newby
Edna
Tuskegee
Nuyaka
Okmulgee
Okmulgee Lake
Okfuskee
Mason
Castle
Okemah
Okemah Lake
Clearview
Pharoah
Bearden
Weleetka
RIVER
Keystone Lake
Wekiwa
Sand Springs
TULSA
Oakhurst
Bowden
Saputpa
Glenpool
Bixby
Kiefer
Kellyville
Lake Heyburn
Polecat
Mounds
Hectc
Ramona
Avant
Skiatook
Hominy
Cleveland
Osage
New Prue
Prue
Delaware
Turley
Owas
Collin
Sper
Henr
Schulte
Coalton
Montezuma
Speiter C
Not To Scal
3RD GUIDE ME
1ST GUIDE MERIDIAN

001056

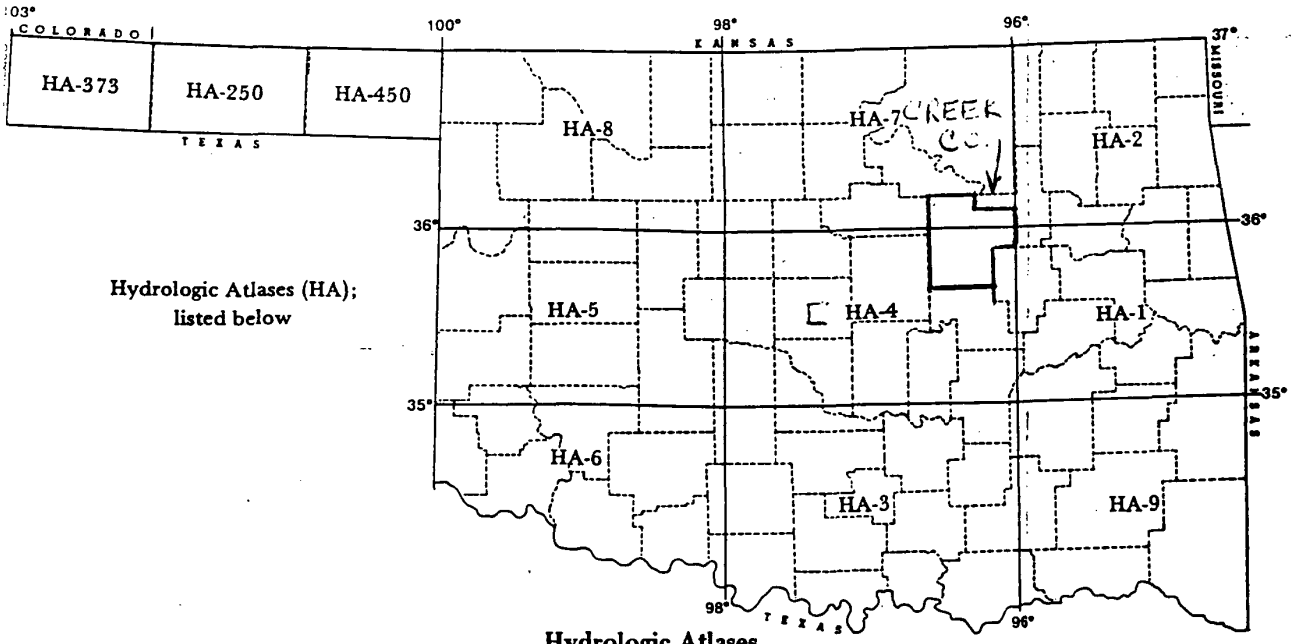

Fairfax
Gray Horse
Wynona
Barnsdall
Wolco
Ramona
Ralston
Coal Cr
Hominy
Skedee
Blackburn
Cleveland
Cleveland Reservoir
Osage
Skiatook
Collinsville
Sperry
Keetonville
Maramec
Hallett
Terlton
Jennings
Quay
Lagoon
New Prue
KEYSTONE LAKE
Turley
Owasso
Catoosa
Wekiwa
Lake Sand Springs
TULSA
Twin Mounds
Yale
Mannford
Silver City
Oilton
Oakhurst
Bowden
Olive
Broken Arrow
Jenks
Sapulpa
Schlegel
Cushing
Drumright
Lake Heyburn
Kellyville
Kiefer
Glenpool
Bixby
Leonard
Shamrock
Avery
Parkland
CREEK
SITE
Bristow
Mounds
Stone Bluff
Hectorville
Kendrick
Depew
Milfay
Stroud
Iron Post
Newby
Edna
Beggs
Preston
Bald Hill
Davenport
Sparks
Arlington
Peyson
Micawber
Tuskegee
Nuyaka
Okmulgee
Okmulgee Lake
Morris
Eram
OKMULGEE
Okfuskee
Mason
Paden
Prague
Boley
Castle
OKFUSKEE
Okemah Lake
Schulter
Grayson
Okemah
Henryetta
Speiter City
Pharoah
Clearview
Bryant
Salem
Lake Henryetta
Not To Scale

001057

EXPLANATION

Alluvium and Terrace Deposits (Quaternary in age). Unconsolidated deposits of sand, silt, clay, and gravel that occur along or adjacent to modern and ancient rivers and streams. Thickness generally ranges from 10 to 50 ft. (locally as much as 100 ft.). Wells generally yield 10 to 500 gpm of water (locally several thousand gpm), and most water is of good quality (less than 1,000 mg/L). Recharge areas are essentially the same as distribution of the alluvium and terrace deposits.

REFERENCES



Hydrologic Atlases (HA); listed below

Hydrologic Atlases

HA-1. Marcher, M.V., 1969, Reconnaissance of the water resources of the Fort Smith Quadrangle, east-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 1, 4 sheets, scale 1:250,000.

HA-2. Marcher, M.V., and Bingham, R.H., 1971, Reconnaissance of the water resources of the Tulsa Quadrangle, northeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 2, 4 sheets, scale 1:250,000.

HA-3. Hart, D.L., Jr., 1974, Reconnaissance of the water resources of the Ardmore and Sherman Quadrangles, southern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 3, 4 sheets, scale 1:250,000.

HA-4. Bingham, R.H., and Moore, R.L., 1975, Reconnaissance of the water resources of the Oklahoma City Quadrangle

HA-7. Bingham, R.H., and Bergman, D.L., 1980, Reconnaissance of the water resources of the Enid Quadrangle, north-central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 7, 4 sheets, scale 1:250,000.

HA-8. Morton, R.B., 1980, Reconnaissance of the water resources of the Woodward Quadrangle, northwestern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 8, 4 sheets, scale 1:250,000.

HA-9. Marcher, M.V., and Bergman, D.L., in preparation, Reconnaissance of the water resources of the McAlester and Texarkana Quadrangles, southeastern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 9, 4 sheets, scale 1:250,000.

HA-250. Wood, P.R., and Hart, D.L., Jr., 1967, Availability of ground water in Texas

001058

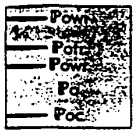
PENNSYLVANIAN

Geuryan

Virgilian

WELLINGTON FORMATION

Red-brown shale and orange-brown fine-grained sandstone, containing much maroon mudstone conglomerate and chert conglomerate to south. Thickness ranges from about 150 feet in south to 500 feet in north.



OSCAR GROUP

Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes *Herington Limestone* at top in Payne County, *Neva Limestone* (0.2 to 1.2 feet thick) at base in Lincoln County, and *Hart Limestone* (4 to 10 feet thick) at base in Pottawatomie County. In Payne County, includes thin stringers of *Winfield Limestone*, Powi (75 feet below top), *Fort Riley Limestone*, Pofr (245 feet below top), *Wreford Limestone*, Powr (345 feet below top), and *Cottonwood Limestone*, Poc (525 feet below top). Thickness ranges from 300 feet in south to 600 feet in north.



VANOSS GROUP

Red-brown to gray shale and orange-brown fine-grained, crossbedded sandstone; grades southward into arkosic sandstone and conglomerate. Includes many thin limestone beds and shale units north of North Canadian River (descending): *Roca Shale* (75 feet thick), *Red Eagle Limestone*, Pvre (3 to 8 feet thick), *Johnson Shale* (60 feet thick), *Long Creek Limestone*, Pvlc (9 to 12 feet thick), *Hughes Creek Shale* (52 feet thick), *Americus Limestone*, Pva (1.0 to 2.5 feet thick), *Admire Shale* (70 feet thick), *Brownville Limestone*, Pvb (1 to 3 feet thick), *Pony Creek Shale* (75 feet thick), *Grayhorse Limestone*, Pvg (1 foot thick), unnamed shale (70 feet thick), *Elmont Limestone*, Pve (1.2 to 7.8 feet thick), *Stonebreaker Shale* (60 feet thick), and *Reading Limestone* (1.5 feet thick), at base. Total thickness of group ranges from 250 feet in south to 490 feet in north.



ADA GROUP

Mostly orange-brown fine-grained sandstone and red-brown to gray shale; grades southward into chert conglomerates. Includes the following thin limestone beds and shale units north of North Canadian River (descending): *Auburn Shale* (80 feet thick), *Wakarusa Limestone*, Paw (1 to 6 feet thick), unnamed shale (95 feet thick), *Bird Creek Limestone*, Pab (1 to 9 feet thick), *Severy-Aarde Shale* (45 feet thick), *Turkey Run Limestone*, Pat (1 foot thick), unnamed shale (45 feet thick), and *Lecompton Limestone* (1.5 to 10 feet thick), at base. Total thickness of group ranges from 100 feet in south to 280 feet in north.



VAMOOSA FORMATION

Alternating thin to massive layers of fine- to coarse-grained sandstone and sandy, silty shale containing some chert conglomerate in middle and lower parts of formation. Thickness ranges from about 200 to about 690 feet.

UNCONFORMITY

Fault, approximately
upthrown side; D, do

001059

EXPLANATION

The stratigraphic nomenclature and age determinations used herein are those accepted by the Oklahoma Geological Survey and do not necessarily agree with those of the U.S. Geological Survey.

Qal

ALLUVIUM

y, and lenticular beds of gravel. Thickness bout 30 to 100 feet and probably averages along major streams. Along minor streams, es from a few feet to about 50 feet and prob- about 25 feet. Alluvium is a major aquifer idrangle.

Qt

TERRACE DEPOSITS

ls of sand, silt, clay, and gravel. Thickness ew feet to about 100 feet and probably aver- eet along major streams. These deposits are along Cimarron, Canadian, and North Cana-

UNCONFORMITY

MARLOW FORMATION

-brown fine-grained gypsiferous sandstone, l-brown shale. Contains 10 feet of calcitic ses near middle and 2 thin dolomites (or p. Exposed thickness, about 50 feet (top 50 ed).

DOG CREEK SHALE

wn silty shale and some fine-grained sand- s one or two layers of thin dolomite (or gyp- art; basal part grades southward into Chick- n. Thickness averages about 200 feet near feet near Chickasha.

Pb

BLAINE FORMATION

psums with thin dolomites below each gyp- led with red-brown shale; grades southward Formation. Thickness, 50 to 75 feet.

Pf

FLOWERPOT SHALE

wn silty clay shale with stringers of gypsum selenite); grades southward into Chickasha ickness, 20 to 40 feet.

Pc

CHICKASHA FORMATION

udstone conglomerate and red-brown to

IAN

Missourian

Phl

HILLTOP FORMATION

Mainly shale, grading upward into massive siltstone and fine-grained sandstone; grades northward into Barnsdall Formation. Chanute Formation, and Dewey Limestone. Thickness ranges from 0 to 200 feet.

Pb

BELLE CITY LIMESTONE

Consists of two fossiliferous limestone units with an intervening fossiliferous shale. Thickness ranges from 12 to 20 feet; present in southern part of area only, where it is below Hilltop Formation.

TALLANT FORMATION

Mostly fine- to medium-grained sandstone 10 to 60 feet thick overlain by shale 25 to 65 feet thick. Cut out by Vamoosa Formation in central part of area. Total thickness ranges from 0 to 100 feet.

Pbd

BARNSDALL FORMATION

Mostly fine-grained sandstone overlain by shale; may grade northward into Wann Formation. Thickness ranges from about 80 to about 200 feet.

Pw

WANN FORMATION and IOLA LIMESTONE

Wann Formation, shale and fine- to medium-grained sandstone; thickness, 40 to 180 feet. Underlying *Iola Limestone*. mainly fine-grained calcareous sandstone and limestone with some shale; thickness, 15 to 20 feet.

CHANUTE FORMATION

Mainly fine- to medium-grained sandstone 3 to 20 feet thick, overlain by shale 20 to 80 feet thick. Total thickness ranges from about 25 to 90 feet.

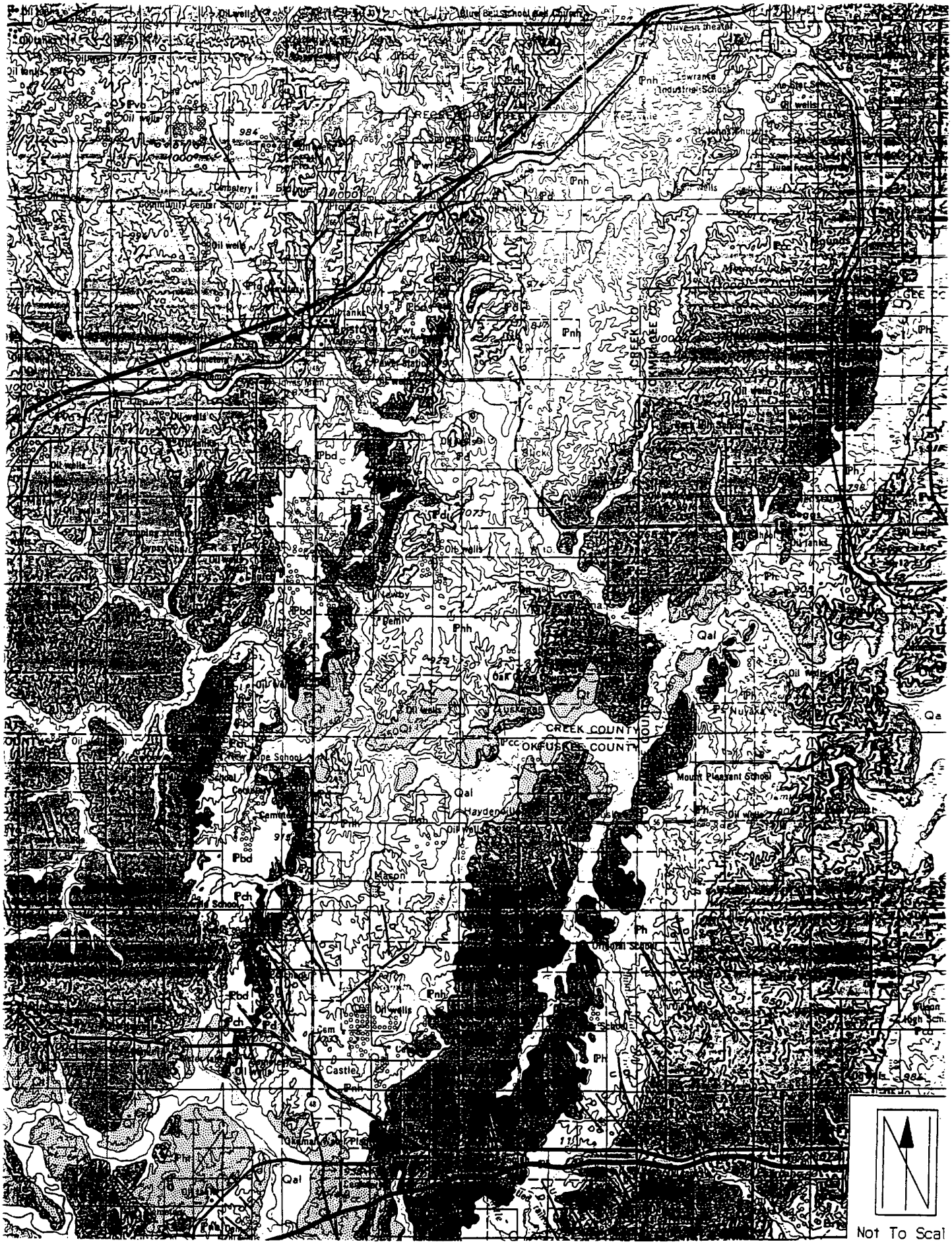
DEWEY LIMESTONE

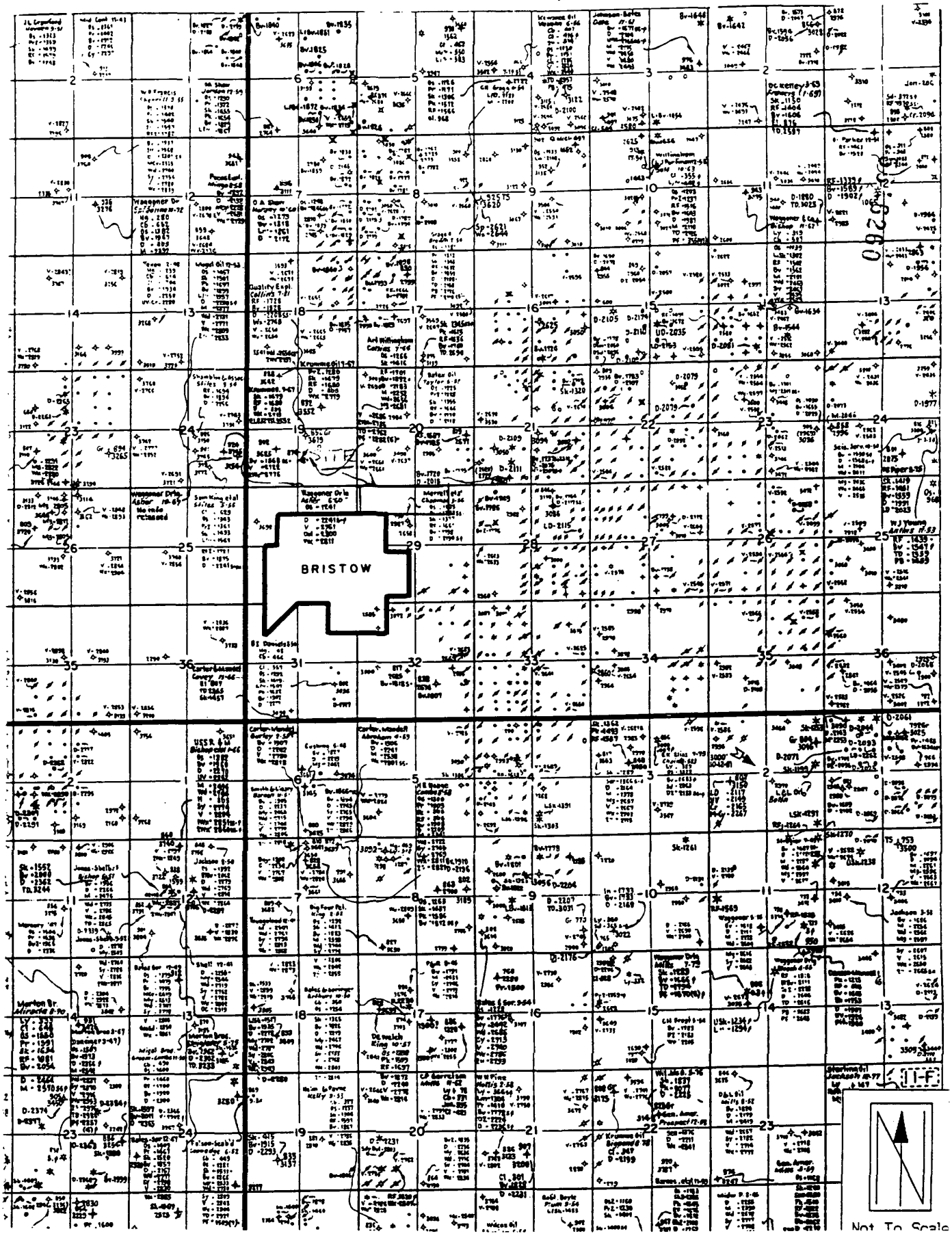
Mainly sandy limestone or calcareous sandstone containing limestone lenses 1.5 to 20 feet thick, overlain by shale 5 to 50 feet thick. Total thickness ranges from 20 to 60 feet.

Pnh

NELLIE BLY FORMATION and HOGSHOOTER LIMESTONE

001060


CREEK COUNTY
OKFUSKEE COUNTY
Not To Scal


BRISTOW
11-F
Not To Scale
001062

MARK S. COLEMAN
Executive Director



DAVID WALTERS
Governor

State of Oklahoma

DEPARTMENT OF ENVIRONMENTAL QUALITY

56.6261

August 5, 1993

Mr. Scott Christenson
United States Geological Survey
202 Northwest 66th Street
Building 7
Oklahoma City, Oklahoma 73101

Dear Mr. Christenson:

The purpose of this letter is to request any information regarding the location and use of wells located in the areas listed on the attached page. The information provided by your office will be used to partly describe ground water targets preliminary site assessments conducted by the DEQ (Superfund), as authorized through a cooperative agreement with the U.S. Environmental Protection Agency. For your convenience, I have enclosed a sample of the type of information needed by your office.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

Sincerely,

Scott Stegmann

Scott Stegmann
Site Assessment Unit
Waste Management Division

Attachments

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg
	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
	4-9, 16-20	4 N	17 E	
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma
	7-9, 15-22, 26-35	12 N	2 W	
	1-4, 9-15, 24	11 N	3 W	
	2-10, 16-19	11 N	2 W	
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek
	19-22, 26-36	18 N	7 E	
	1-3, 10-15, 23-26, 36	17 N	6 E	
	1-24, 26-34	17 N	7 E	
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
	6	11 N	18 E	
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee
	17-22, 26-35	12 N	13 E	
	1-4, 9-16, 22-26	11 N	12 E	
	2-11, 14-22, 28-30	11 N	13 E	
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek
	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

LOCAL WELL NUMBER	OWNER	DEPTH DRILLED (FEET)	DEPTH OF WELL (FEET)	ALTITUDE OF LAND SURFACE (FEET)	WATER LEVEL (FEET)	WATER-LEVEL DATE	AQUIFER CODE	PRIMARY USE OF WATER
10N-03W-14 CDC 1	Moore, City of, Well 3	—	690	1230	—	—	318GRBR	P
10N-03W-14 DB 1	Moore, City of, Test Hole Loc B.	864	864	1240	—	—	317GBWG	U
10N-03W-14 DBB 1	Moore, City of, (Abandoned)	—	501	1250	160	11-10-42	318GRBR	P
10N-03W-15 ABB 1	Moore, City of, Well 9	—	800	1250	250	00-00-63	318GRBR	P
10N-03W-15 ACC 1	Moore, City of, Well 2	609	609	1240	215.12	07-23-45	318GRBR	P
10N-03W-15 CBA 1	Moore, City of, Well 6	—	735	1240	220	06-08-62	318GRBR	P
10N-03W-15 CDC 1	Moore, City of, Well 1	—	750.	—	—	—	317GBWG	P
10N-03W-16 AAA 1	Moore, City of, Well 31	—	—	—	—	—	317GBWG	P
10N-03W-16 ACA 1	Moore, City of, Well 20	—	750	—	—	—	317GBWG	P
10N-03W-17 BAA 1	Mustang, City of, Well 2	820	820	1222	447	09-08-86	317GBWG	P
10N-03W-17 CBC 1	Mustang, City of, Well 1	845	795	1190	423	11-22-83	317GBWG	P
10N-03W-17 DB 1	Mustang, City of Test Hole 1	891	891	1210	—	—	—	U
10N-03W-17 DDC 1	Mustang, City of, Test Hole M-11	1000	1000	1200	—	—	—	U
10N-03W-21 AAA 1	—	—	318.00	1228	284.26	03-04-87	318GRBR	U
10N-03W-21 AAA 2	—	—	93.00	—	—	—	112TRRCH	U
10N-03W-21 AC 1	Miller 1	8914.	8914	1217	—	—	318HNSS	Z
10N-03W-22 CBA 1	Moore, City of, Well 12	—	880	1214	—	03-31-84	318GRBR	P
10N-03W-22 CCC 1	Moore, City of, Well 21	805	795	1210	370	09-05-86	317GBWG	P
10N-03W-22 DAD 1	Moore, City of, Well 10	—	795	1210	400.00	08-04-87	318GRBR	P
10N-03W-23 ACA 1	Moore, City of, Well 19	—	—	1210	—	—	317GBWG	P
10N-03W-23 DCC 1	Moore, City of, Well 28	820	820	1225	449	09-05-86	317GBWG	P
10N-03W-23 DDD 1	Moore, City of, Well 23	—	—	1225	—	—	317GBWG	P
10N-03W-24 AAA 1	Moore, City of, Well 24	—	767	1185	—	—	317GBWG	P
10N-03W-24 ABB 1	Moore, City of, Well 15	—	734	1220	—	—	317GBWG	P
10N-03W-24 CAA 1	Moore, City of, Well 30	—	—	—	—	—	317GBWG	P
15N-08E-11 AAA 1	—	—	119	—	—	—	323TLNT	U
15N-09E-07 DDA 1	—	—	69.0	—	43.00	04-01-70	323BRDL	U
16N-08E-13 DCD 1	—	—	158	—	—	—	—	U
16N-08E-22 CCD 1	—	—	92.0	850	65	10-15-70	322VMOS	U
16N-08E-27 DDA 1	—	—	140	—	—	—	—	U
16N-09E-06 DA 1	Krumme Oil Co.	—	400	—	50	08-01-69	323WANN	N
16N-09E-06 DDD 1	—	—	120	—	—	—	323TLNT	U
16N-09E-08 CB 1	Krumme Oil Co.	—	325	—	60	11-01-65	323WANN	U
16N-09E-25 ABB 1	—	—	52.0	830	37.00	10-01-70	323DEWY	U
16N-09E-29 C 1	Bristow, City of	—	200	—	120	07-20-71	323BRDL	P
17N-07E-02 BAB 1	—	—	121	—	—	—	—	U
17N-07E-05 A 1	Krumme Oil Co.	—	1145	—	—	—	323BRDL	U
17N-07E-05 AD 1	Gulf Oil Co.	—	1138	—	649	06-01-62	323BRDL	U
17N-07E-06 ACB 1	Drumright, City of	—	260	930	85	07-23-71	322VMOS	P
17N-07E-08 CBC 1	Drumright, City of	—	403	900	75	07-23-71	322VMOS	P

5616263

5616264

REFERENCE 14

Wilcox Oil Company (CERCLIS ID OKD0001010917)
Net Annual Precipitation Calculation

Month	Precipitation (inches)	Temperature (degrees F)	Factor	Evaporation (inches)	Net Precipitation (inches)
Jan	1.50	37.0	0.83	0.10	1.41
Feb	1.64	42.0	0.91	0.34	1.30
Mar	2.09	49.0	0.99	0.91	1.18
Apr	3.41	61.0	1.09	2.46	0.95
May	5.18	68.0	1.18	3.84	1.34
Jun	4.32	77.0	1.22	5.81	0.00
Jul	2.85	83.0	1.20	7.10	0.00
Aug	2.70	82.0	1.13	6.48	0.00
Sep	3.30	74.0	1.04	4.40	0.00
Oct	2.82	63.0	0.94	2.39	0.43
Nov	1.90	49.0	0.85	0.78	1.12
Dec	1.43	41.0	0.81	0.25	1.18

Annual Net Precipitation ***8.91 inches***

3116265

$$a = 6.75e\text{-}7\, I^3 - 7.71e\text{-}5\, I^2 + 1.79e\text{-}2\, I + 0.49$$

$$I = \sum_{i=1}^{12} (T_i/5)^{1.5}$$

$$E_i = 1.6F_i(10T_i / I)^a$$

E_i = Monthly potential evapotranspiration in inches for month i.

F_i = Monthly latitude adjusting value for month i.

T_i = Mean monthly temperature in degrees Celsius for month i.

Source: Dunne, T. and Leopold, L.B. 1978. Water in Environmental Planning. W.H. Freeman and Company, New York.

5616266

REFERENCE 15

MEMORANDUM

December 7, 1994

From: David Cates, Environmental Specialist, DEQ, Superfund (Site Assessment Unit).

To: Wilcox Oil Company Site Preliminary Assessment (PA)

Re: Public Water Supply near Bristow, Oklahoma.

Much of the following information was obtained during a telephone conversation on 11/28/94 with Danny Trout of the Bristow, Oklahoma, Public Works Department. The City of Bristow municipal water supply system has eight active wells which are connected via a distribution network to four water storage towers. The towers and wells are interconnected forming a blended system with line taps occurring before and after the towers. The system serves 4,300 people in Bristow and 119 people in Slick, Oklahoma. Water supply to the system is obtained from wells only. The water is chlorinated at the well head.

Three of Bristow's eleven wells reported to be active on the public water supply database (#'s 3, 7 & 21) are no longer part of the system (References A; B; C;). Well #7 which is incorrectly located on the database has been plugged and abandoned as a result of deactivating an underground water storage system to which it was connected. The correct location of this well was in the NE/4 SE/4 NE/4 of Section 30-T16N-R9E instead of R8E, which puts it about one quarter mile southwest of the site. Well #3 is apparently plugged and abandoned, also. Well #21 was given to Mid-America Cafe who presumably is using it for water supply.

Well #18 is incorrectly located on the public water supply database also. It should be in the SW/4 SW/4 SE/4 of Section 25-T16N-R8E instead of in the SW/4 SW/4 SW/4 of the section, which puts it within the 2 mile radius of the site. All the wells except #14 are located in the 1 to 2 mile radius zone. Well #14 is within the one half to 1 mile radius zone.

A hand dug well which has the dimensions of 30 feet in diameter by 200 feet deep was reported to be located in the NW/4 NE/4 NE/4 of Section 31-T16N-R9E. This municipal water supply well has the capability of producing but is currently shut down. An industrial well about 200 feet deep which supplies drinking water to the employees of the McAdams Pipeline Company was reported in the SE/4 SE/4 of Section 19-T16N-R9E. This well is not shown on any of the public information because apparently it was drilled in the 1950's prior to record keeping. Well #15 which was located in the SW/4 NE/4 SE/4 of Section 30-T16N-R9E, about one half mile southwest of the site, was supposedly plugged and abandoned because of diesel contamination following a train derailment. No other wells have been reported to be contaminated or abandoned because of contamination.

-116267

Three of Bristow's water supply wells are high capacity wells (#'s 20, 22, & 23), producing 200 gpm each. The other five wells (#'s 14, 16, 17, 18, 19) are small capacity wells which produce at rates from 50 gpm to 90 gpm. Not all of the wells are produced at once. Instead, two large capacity wells and one small capacity well are pumped together on a daily basis. The specific wells in this production scheme are changed periodically.

Records indicate there are two mobile home parks which have their own public water supply wells. Fogle Mobile Home Park is currently on city water and their well is reported to be inactive. It is unknown whether or not this well has been plugged and abandoned. The records show that a water supply well 120 feet deep serves 50 people of the Evergreen trailer park.

Apportionment of the population to the wells for Bristow's water supply system is based on the relative contribution of each well to the system, considering individual well capacities. The following reasons are given to support this type of apportionment: the wells are part of a blended system, they lie within two radius categories, and one well produces more than forty per cent of the daily water supply according to the production scheme cited above. Also, since annual production data is lacking, it is assumed that the large capacity wells operate for 120 days each and the small capacity wells operate for 73 days each. However, considering these durations and individual well capacities, no one well contributes more than forty per cent of the total capacity of all wells on an annual basis. The table below shows the apportionment for the total population of 4416 people (4300 from Bristow plus 116 from Slick).

POPULATION SERVED BY WELLS

WELLS ID	CAPACITY (DAILY)	EST.PROD. (ANNUAL)	POP. FRACTION	POP. SERVED
# 14	72,000	5,256,000	0.0374	165.16
# 16	72,000	5,256,000	0.0374	165.16
# 17	100,800	7,358,400	0.0524	231.40
# 18	129,600	9,460,800	0.0673	297.20
# 19	129,600	9,460,800	0.0673	297.20
# 20	288,000	34,560,000	0.2460	1086.34
# 22	288,000	34,560,000	0.2460	1086.34
# 23	288,000	34,560,000	0.2460	1086.34
Totals	1,368,000	140,472,000	0.9998	4415.14

The population served by well #14 is assigned to the 1/2 to 1 mile radius zone. Since the other wells are situated in the one to two mile zone, the remaining apportioned population is placed within this zone.

REFERENCES

A. Stegmann, S., DEQ, *Letter of Request for Public Water Supply information: Mike Harrell, Water Quality Division.* August 5, 1994. (Response attached).

B. Oklahoma Department of Environmental Quality. *Public Water Supply Reports.* 1988.

C. Oklahoma Department of Environmental Quality. *Public Water Supply Database Computer Printout.* June 26, 1992.

001071

MEMORANDUM

August 5, 1994

To: Mike Harrell, Water Quality Division

From: Scott Stegmann, Site Assessment, Waste Management Division

Subject: Request for Public Water Supply information

The following request is for Public Water Supply information concerning the attached sites. The information provided by your division will be used in partial completion of Superfund preliminary assessments of these sites.

The following sections with the accompaning township and ranges is the area of study for this project. The following fields for each public water supply are needed from your division: pwsid #, system name, source, aquifer, location, activity, type, and population served.

Your assistance is greatly appreciated by me and our division. If you have any questions, please call me at 271-7049.

RECEIVED
AUG - 8 1994
WATER

SITE NAME	Sections	Township	Range	County
AT & SF Roundhouse	1, 10-15, 21-28, 33-36	10 N	3 E	Pottawatomie
	5-10, 14-23, 26-35	10 N	4 E	
	1-4, 10-14	9 N	3 E	
	2-10, 16-18	9 N	4 E	
Ben Franklin Refining Company	9-17, 20-36	4 S	4 W	Jefferson
	7, 8, 16-21, 28-33	4 S	3 W	
	1-6, 8-16, 22-24	5 S	4 W	
	4-9, 17, 18	5 S	3 W	
Chicago, Rock Island, & Pacific Roundhouse	35, 36	11 N	3 E	Pottawatomie
	31-33	11 N	4 E	
	1-3, 9-16, 21-28, 33-36	10 N	3 E	
	3-10, 14-23, 26-34	10 N	4 E	
	1-3, 11, 12	9 N	3 E	
	3-8.	9 N	4 E	
Mercury Oil Refining Company	7, 17-21, 28-33	11 N	2 W	Oklahoma
	9-17, 19-36	11 N	3 W	
	4-8, 17, 18	10 N	2 W	
	1-17, 21-24	10 N	3 W	
Rock Island Roundhouse - Haileyville	10-16, 20-29, 32-36	5 N	16 E	Pittsburg
	7, 17-21, 28-33	5 N	17 E	
	1-5, 8-17, 21-24	4 N	16 E	
	4-9, 16-20	4 N	17 E	
10th Street Sludge	10-16, 21-28, 33-36	12 N	3 W	Oklahoma
	7-9, 15-22, 26-35	12 N	2 W	
	1-4, 9-15, 24	11 N	3 W	
	2-10, 16-19	11 N	2 W	
Tide Water Associated Oil Company	25, 26, 35, 36	18 N	6 E	Creek
	19-22, 26-36	18 N	7 E	
	1-3, 10-15, 23-26, 36	17 N	6 E	
	1-24, 26-34	17 N	7 E	
United States Smelting	13, 23-26, 35, 36	12 N	16 E	McIntosh
	4, 7-36	12 N	17 E	
	18, 19, 30, 31	12 N	18 E	
	1, 2, 12	11 N	16 E	
	1-18.	11 N	17 E	
	6	11 N	18 E	
Victory Metals	13, 22-27, 33-36	12 N	12 E	Okmulgee
	17-22, 26-35	12 N	13 E	
	1-4, 9-16, 22-26	11 N	12 E	
	2-11, 14-22, 28-30	11 N	13 E	
Wilcox Oil Company	1-2, 10-15, 22-27, 34-36	16 N	8 E	Creek
	3-11, 13-36	16 N	9 E	
	1-3, 11, 12	15 N	8 E	
	2-10, 17, 18	15 N	9 E	

RECEIVED
AUG - 8 1994

WSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE
2001955	CAMP BRISTOW	01	WELL 1	UNKNOWN		SW4NW4NW4S05T16NR09EIM	A	N
2001940	COUNTRY HILLS MHP #2 N	01	WELL 2	VAMOOSA	00220	SE4SW4SE4S07T16NR09EIM	A	T
2001941	MACK'S COUNTRY STORE	01	WELL 1	UNKNOWN		SW4NW4NW4S08T16NR09EIM	A	N
2001904	COUNTRY HILLS MHP #1 S	01	WELL 1	VAMOOSA	00220	NE4NE4NW4S18T16NR09EIM	A	T
2001964	FOOD DISTRIBUTORS	01	WELL 1	UNKNOWN		NE4NW4NE4S20T16NR09EIM	A	S
2001910	BRISTOW	09	WELL 14	VAMOOSA	00200	SE4NE4SW4S30T16NR09EIM	A	C
2001905	FOGLE MHP	01	WELL 1	VAMOOSA	00120	SE4NE4NW4S31T16NR09EIM	I	C
2001910	BRISTOW	07	WELL 3	VAMOOSA	00100	NW4SE4NE4S31T16NR09EIM	A	C
2001910	BRISTOW	01	WELL 16	VAMOOSA	00200	NE4NE4NE4S32T16NR09EIM	A	C

5616272

PWSID	SYSTEM	SOURCEID	SOURCE	AQUIFER	DEPTH	LOCATION	ACTIVITY	TYPE
2001910	BRISTOW	05	WELL 22	ADA-VAMOOSA	00545	NW4SE4NE4S24T16NR08EIM	A	C
2001910	BRISTOW	06	WELL 23	ADA-VAMOOSA	00545	NE4NW4NE4S24T16NR08EIM	A	C
2001910	BRISTOW	11	WELL 21	ADA-VAMOOSA	00545	NW4NE4SE4S24T16NR08EIM	A	C
2001973	MID-AMERICA CAFE	01	WELL 1		00545	NE4NE4SE4S24T16NR08EIM	A	N
2001910	BRISTOW	02	WELL 18	VAMOOSA	00200	SW4SW4SW4S25T16NR08EIM	A	C
2001910	BRISTOW	03	WELL 19	VAMOOSA	00200	SW4SE4SE4S25T16NR08EIM	A	C
2001910	BRISTOW	04	WELL 20	ADA-VAMOOSA	00450	NW4NE4NE4S25T16NR08EIM	A	C
2001910	BRISTOW	10	WELL 17	VAMOOSA	00200	SE4SW4SE4S25T16NR08EIM	A	C
2001910	BRISTOW	08	WELL 7	VAMOOSA	00200	NE4SE4NE4S30T16NR08EIM	A	C
3001937	KUYKENDALL MHP	01	BRISTOW	UNKNOWN		NE4SW4NW4S31T16NR08EIM	A	N
2001906	EVERGREEN TP	01	WELL 1	VAMOOSA	00120	NW4SE4NW4S36T16NR08EIM	A	C
2001976	BRISTOW ELKS LODGE #1614	01				SE4SE4NE4S36T16NR08EIM	A	N

55:6273

PUBLIC WATER SUPPLY REPORT

FACILITY: BRISTOW
OPERATOR: BRISTOW
ADDRESS : 110 WEST 7TH STREET
BRISTOW OK 74010
PHONE : 918 3672454
SYSTEMS SERVED:
3001921 SLICK

MSIS-NUMBER : 2001910
COUNTY : CREEK
POPULATION SERVED: 5000

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 16	NE4SW4SW4S32T16NR08EIM	00200
WELL 18	SW4SW4SW4S25T16NR08EIM	00200
WELL 19	SW4SE4SE4S25T16NR08EIM	00200

STORAGE CAPACITY : 1500000 GALLONS
AVERAGE PRODUCTION: 400000 GALLONS/DAY
PRODUCTION CAPACITY: 1152000 GALLONS/DAY
TREATMENT:
DISINFECTION - CHLORINE GAS

5616274

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	98.2	
CHLORIDE	MG/L	20	58
FLUORIDE TOTAL	MG/L	0.14	0.56
NITRITE-NITRATE AS N	MG/L	< 0.5	1.0
PH (LAB)	STD UNIT	7.30	7.05
SULFATE	MG/L	< 20	< 20
SOLIDS,TOTAL DISS	MG/L	292	256
ALKALINITY,TOTAL	MG/L	248.0	141
HARDNESS,TOTAL	MG/L	286	124
TURBIDITY	NTU	< 1.00	3
WATER TEMPERATURE	DEG CELS	19.0	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	310	< 200
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	< 10	< 10
COPPER-TOTAL	UG/L	22	27
IRON-TOTAL	UG/L	< 100	1580
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	30	56.00
ZINC-TOTAL	UG/L	29	72
CORROSIVITY	(CALC)	- 0.33	

001076

PUBLIC WATER SUPPLY REPORT

FACILITY: FOGLE MHP
OPERATOR: FOGLE MHP
ADDRESS : PO BOX 630
BRISTOW OK 74010
PHONE : 918 3673427

MSIS-NUMBER : 2001905
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER:	LEGAL DESCRIPTION	DEPTH
WELL 1	SE4NE4NE4S31T16NR09EIM	00120

STORAGE CAPACITY : GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

5616275

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	172.5	
CHLORIDE	MG/L	15	14
FLUORIDE TOTAL	MG/L	< 0.10	0.56
NITRITE-NITRATE AS N	MG/L	4.1	5.8
PH (LAB)	STD UNIT	7.20	6.43
SULFATE	MG/L	43	48
SOLIDS,TOTAL DISS	MG/L	410	387
ALKALINITY,TOTAL	MG/L	279.0	262
HARDNESS,TOTAL	MG/L	299	283
TURBIDITY	NTU	< 1.00	< 1
WATER TEMPERATURE	DEG CELS	16.5	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	350	< 200
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	< 10	< 10
COPPER-TOTAL	UG/L	10	39
IRON-TOTAL	UG/L	< 100	< 100
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	36	37.00
ZINC-TOTAL	UG/L	79	180
CORROSIVITY	(CALC)	- 0.08	

001077

PUBLIC WATER SUPPLY REPORT

FACILITY: EVERGREEN TP
OPERATOR: EVERGREEN TP
ADDRESS : RT 1 BOX 77
BRISTOW OK 74010
PHONE : 918 3672692

MSIS-NUMBER : 2001906
COUNTY : CREEK
POPULATION SERVED: 50

SOURCE OF WATER: WELL 1
LEGAL DESCRIPTION: NW4SE4SE4S36T16NR08EIM
DEPTH: 00120

STORAGE CAPACITY : 4900 GALLONS
AVERAGE PRODUCTION: GALLONS/DAY
PRODUCTION CAPACITY: GALLONS/DAY

5516276

PARAMETERS	UNITS	1986	1983
HARDNESS,CALCIUM	MG/L	98.2	
CHLORIDE	MG/L	21	28
FLUORIDE TOTAL	MG/L	0.13	0.60
NITRITE-NITRATE AS N	MG/L	1.2	1.7
PH (LAB)	STD UNIT	6.80	7.05
SULFATE	MG/L	< 20	< 20
SOLIDS,TOTAL DISS	MG/L	226	239
ALKALINITY,TOTAL	MG/L	169.0	164
HARDNESS,TOTAL	MG/L	191	173
TURBIDITY	NTU	< 1.00	< 1
WATER TEMPERATURE	DEG CELS	16.5	
ARSENIC-TOTAL	UG/L	< 10	< 10
BARIUM TOTAL	UG/L	300	242
CADMIUM-TOTAL	UG/L	< 2	< 2
CHROMIUM-TOTAL	UG/L	10	< 10
COPPER-TOTAL	UG/L	4	4
IRON-TOTAL	UG/L	< 100	< 100
LEAD-TOTAL	UG/L	< 20	< 20
MANGANESE-TOTAL	UG/L	< 20	< 20.0
MERCURY-TOTAL	UG/L	< 0.5	< 0.5
SELENIUM-TOTAL	UG/L	< 5	< 5
SILVER-TOTAL	UG/L	< 3	< 3.0
SODIUM-TOTAL	MG/L	17	18.00
ZINC-TOTAL	UG/L	34	63
CORROSIVITY	(CALC)	- 0.93	

001078

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200190[illegible]                    0190203              9183672[illegible]OK
200190[illegible]    X
200190[illegible]              19      0        0      40000     40000        0      40000
200191000[illegible] C[illegible]574000305000[illegible]          SA000000    NBRISTOW
200191000[illegible] 01WELL 16  7       G       PVAMO03549550962430        000000000000G      01
200191000[illegible] 01VAMOOSA          0005800200                                            02
200191000[illegible] 01                                                 NE4NE4NE4S32T16NR09EIM03
200191000[illegible] 02WELL 18  7       G       OVAMO03549550962430        000000000000G      01
200191000[illegible] 02VAMOOSA          0005800200                                            02
200191000[illegible] 02                                                 SW4SW4SW4S25T16NR08EIM03
200191000[illegible] 03WELL 19  7       G       VAMO03549550962430         000000000000G      01
200191000[illegible] 03VAMOOSA          0005800200                                            02
200191000[illegible] 03                                                 SW4SE4SE4S25T16NR08EIM03
200191000[illegible] 04WELL 20  7       G       PADA-03549550962430        000000000000G      01
200191000[illegible] 04ADA-VAMOOSA      0004200450                                            02
200191000[illegible] 04                                                 NW4NE4NE4S25T16NR08EIM03
200191000[illegible] 05WELL 22          G       PADA-03549550962430        000000000000G      01
200191000[illegible] 05ADA-VAMOOSA      0004200545                                            02
200191000[illegible] 05                                                 NW4SE4NE4S24T16NR08EIM03
200191000[illegible] 06WELL 23  7       G       PADA-03549550962430        000000000000G      01
200191000[illegible] 06ADA-VAMOOSA      0004200545                                            02
200191000[illegible] 06                                                 NE4NW4NE4S24T16NR08EIM03
200191000[illegible] 07WELL 3           G       OVAMO03549550962430        000000000000G      01
200191000[illegible] 07VAMOOSA          0005800100                                            02
200191000[illegible] 07                                                 NW4SE4NE4S31T16NR09EIM03
200191000[illegible] 08WELL 7 capped    G       RVAMO03549550962430        000000000000G      01
200191000[illegible] 08VAMOOSA          0005800200                                            02
200191000[illegible] 08                                                 NE4SE4NE4S30T16NR08EIM03
200191000[illegible] 09WELL 14  7       G       OVAMO03549550962430        000000000000G      01
200191000[illegible] 09VAMOOSA          0005800200                                            02
200191000[illegible] 09                                                 SE4NE4SW4S30T16NR09EIM03
200191000[illegible] 10WELL 17  7       G       OVAMO03549550962430        000000000000G      01
200191000[illegible] 10VAMOOSA          0005800200                                            02
200191000[illegible] 10                                                 SE4SW4SE4S25T16NR08EIM03
200191000[illegible] 11WELL 21  7       G       ADA-03549550962430         000000000000G      01
200191000[illegible] 11ADA-VAMOOSA      0004200545                                            02
200191000[illegible] 11                                                 NW4NE4SE4S24T16NR08EIM03
200191000[illegible] BRISTOW
200191000[illegible] 100 W 7TH ST                       BRISTOW             OK74010     M
200191000[illegible] BRISTOW                            % WATER DEPARTMENT
200191000[illegible] 110 WEST 7TH STREET                BRISTOW             OK74010
200191000[illegible]                    0190203              91836724540K
200191000[illegible]    X
200191000[illegible]          1980   1845    400000    500000   1152000        0    1500000
200191100[illegible] C[illegible]574000000025[illegible]          SA000000      NSHAMROCK
200191100[illegible] 01WELL 1           G       PVAMO03554500963515        100000000001       01
200191100[illegible] 01VAMOOSA          0005800485                                            02
200191100[illegible] 01ADDRESS CHANGED 27MAR90 FAB                                  NE4SE4NE4S32T17NR07EIM03
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001079

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2001903035 DEPEW
2001903040 PO BOX 357                          DEPEW                OK74028
2001903045                  0190203                 9183245251OK
2001903050      X
2001903055              140     250      75000     432000          0          0      50000
2001904001 NC6770000000121              SA000000       NCOUNTRY HILLS MHP #1 S
2001904005 01WELL 1           G         PVAMO                                 Y      01
2001904005 01VAMOOSA          0005800220                                               02
2001904005 01                                                  NE4NE4NW4S18T16NR09EIM03
2001904025 COUNTRY HILLS MHP #1 SOUTH
2001904030 RT 3 BOX 63                         BRISTOW              OK74010     I
2001904035 COUNTRY HILLS MHP #1 SOUTH
2001904040 RT 3 BOX 63                         BRISTOW              OK74010
2001904045                  0190203                 9183679234OK
2001904050      X
2001904055              9       0          0          0          0          0          0
2001905001 CC6770000000501              SA000000       NFOGLE MHP
2001905005 01WELL 1           G         PVAM003605000962450          100000000000      01
2001905005 01VAMOOSA          0005800120                                               02
2001905005 C1                                                  SE4NE4NW4S31T16NR09EIM03
2001905025 FOGLE MHP
2001905030 PO BOX 630                          BRISTOW              OK74010     I
2001905035 FOGLE MHP                           % RAY FOGLE
2001905040 PO BOX 630                          BRISTOW              OK74010
2001905045                  0190203                 9183673427OK
2001905050      X
2001905055              14      0          0          0          0          0          0
2001906001 CC6770000000501              SA000000       NEVERGREEN TP
2001906005 01WELL 1           G         PVAM003554150962700          100000000000      01
2001906005 01VAMOOSA          0005800120                                               02
2001906005 01                                                  NW4SE4NW4S36T16NR08EIM03
2001906025 EVERGREEN TP
2001906030 RT 1 BOX 77                         BRISTOW              OK74010     I
2001906035 EVERGREEN TP                        % RONALD BOYD
2001906040 RT 1 BOX 77                         BRISTOW              OK74010
2001906045                  0190203                 9183672692OK
2001906050      X
2001906055             21       0          0          0          0          0       4900
2001907001 CC6770000000501              SA000000       NCREEK COUNTY RWD #10
2001907005 01BIG WELL         G         PVAM003605000963010          100000000000      01
2001907005 01VAMOOSA          00058                                                    02
2001907005 01                                                  NE4SW4NE4S08T18NR09EIM03
2001907005 02LITTLE WELL      G         PVAM003605000963010          100000000000      01
2001907005 02VAMOOSA          00058                                                    02
2001907005 02                                                  SE4SE4NW4S08T18NR09EIM03
2001907025 CREEK COUNTY RWD #10
2001907030 RT 2, BOX 942                       MANNFORD             OK74044     I
2001907035 CREEK COUNTY RWD #10                JOSEPHINE PATKOFF
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2001971045                    019                              CK
2001971050              X
2001971055                    2       0       0       0       0       0       0
2001972001 NO291000000O251            SA                MIDAMERICA CAFE
2001972005 01WELL 1                                                          01
2001972005 01                                                                02
2001972005 01                                                   S  T  R      M03
2001972025 MIDAMERICA  CAFE
2001972030 PO BOX 900                          BRISTOW,              OK74010    I
2001972035 MIDAMERICA CAFE
2001972040 PO BOX 900                          BRISTOW               OK74010
2001972045                    019                   91836723000K
2001972050              X
2001972055                    1       0       0       0       0       0       0
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2001973025 MID-AMERICA CAFE
2001973030 BOX 900                             BRISTOW               OK74010    I
2001973035 MID-AMERICA CAFE
2001973040 BOX 900                             BRISTOW               OK74010
2001973045                    019                   91836723000K
2001973050              X
2001973055                    5       0       0       0       0       0       0
2002001001 C06120000014751            SA000000      NTHOMAS PWA
2002001005 01WELL 1           G       PRUSH03544000984350       100000000000G    01
2002001005 01RUSH SPRINGS SS0000200220                                       02
2002001005 01                                                 NW4NW4NE4S32T15NR14WIM03
2002001005 02WELL 2           G       PRUSH03544000984350       100000000000G    01
2002001005 02RUSH SPRINGS SS0000200220                                       02
2002001005 02                                                 NW4NW4SE4S32T15NR14WIM03
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2002001005 03RUSH SPRINGS SS0000200220                                       02
2002001005 03                                                 NW4NW4SE4S32T15NR14WIM03
2002001005 04WELL 4           G       PRUSH03544000984350       100000000000G    01
2002001005 04RUSH SPRINGS SS0000200185                                       02
2002001005 04                                                 NW4SE4SE4S32T15NR14WIM03
2002001005 05WELL #5          G       PRUSH                                  01
2002001005 05RUSH SPRINGS SS00002                                            02
2002001005 05                                                 NW4SE4SE4S32T15NR14W M03
2002001025 THOMAS
2002001030 BOX 250                             THOMAS                OK73669    I
2002001035 THOMAS PWA                                                  0279.00
2002001040 BOX 250                             THOMAS                OK73669
2002001045                    0200405               40566125020K
2002001050     X
2002001055                525     525     110000    160000    400000        0
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5,516,280

REFERENCE 16

CROSS - REFERENCE TARGET

DRAWING OUT REFER TO 35MM FILM

ROY WESTON

5616281

Pull out 1

Box # 75

5616282

REFERENCE 17

NATIONAL FLOOD INSURANCE PROGRAM

FHBM

FLOOD HAZARD BOUNDARY MAP

CREEK COUNTY, OKLAHOMA

UNINCORPORATED AREA

PANEL 7 OF 10

(SEE MAP INDEX FOR PANELS NOT PRINTED)

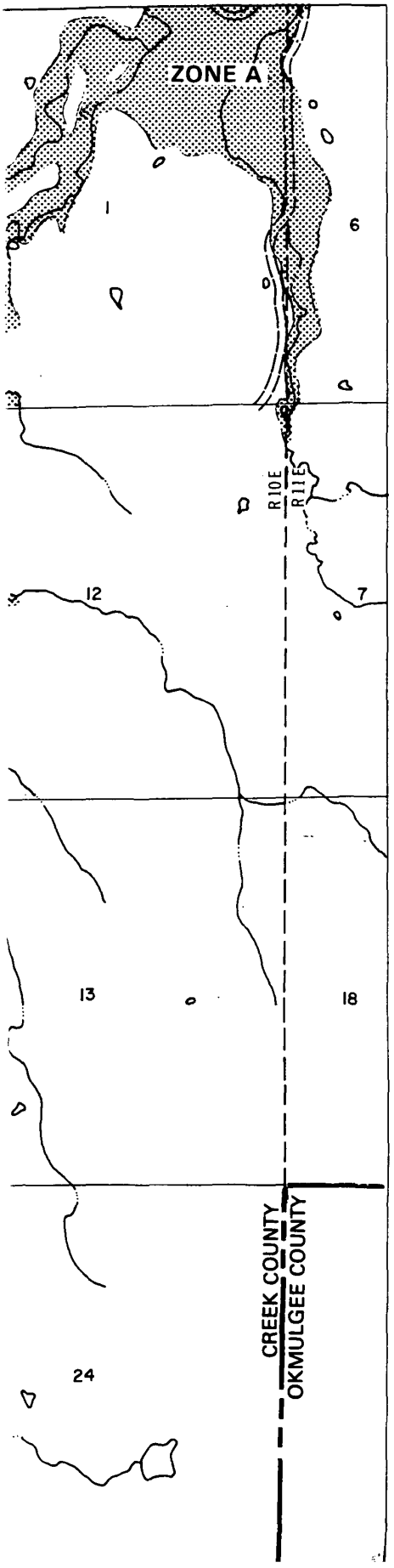
COMMUNITY-PANEL NUMBER
400490 0007 A

EFFECTIVE DATE:
MAY 19, 1981



federal emergency management agency
federal insurance administration

56-1283



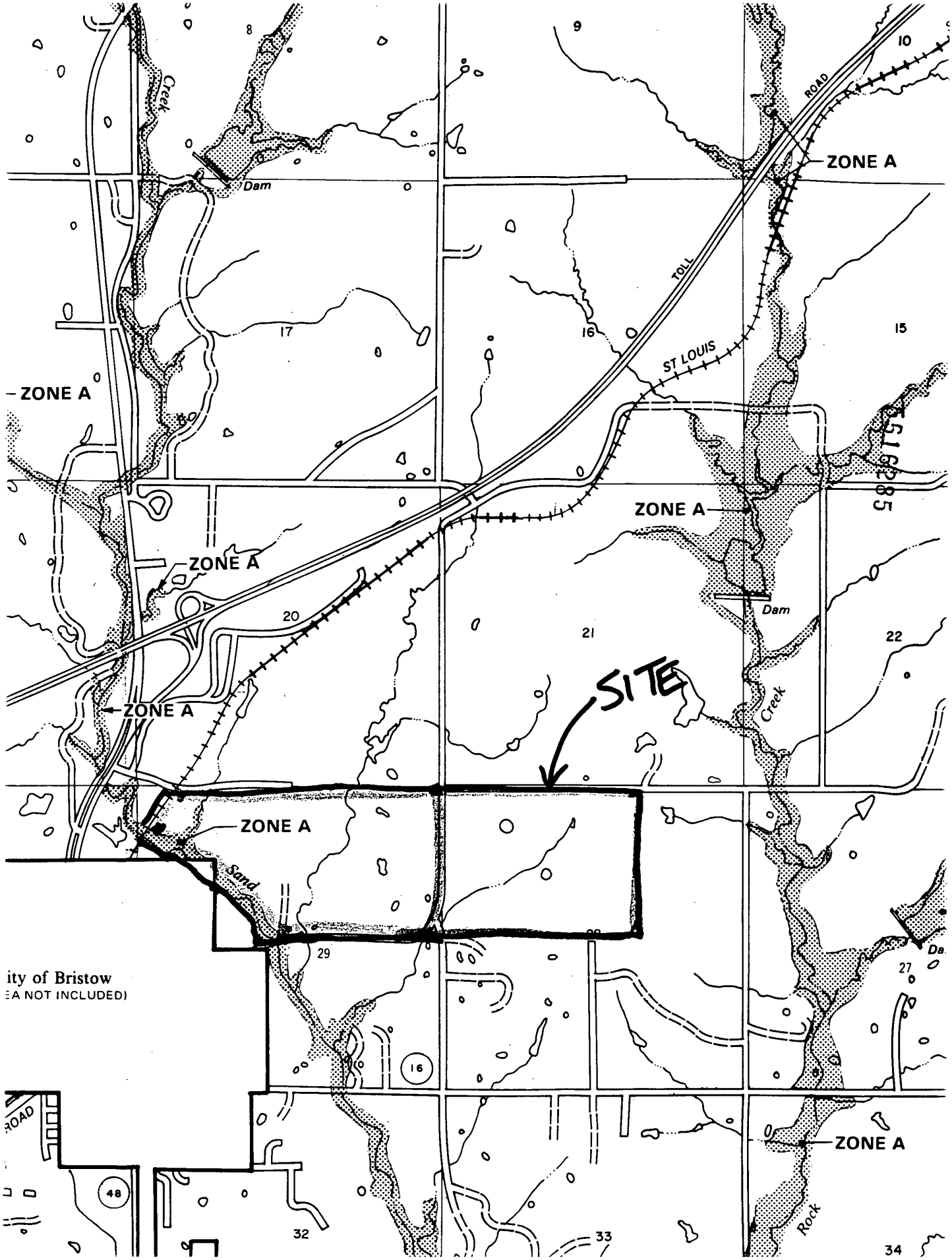
KEY TO MAP

SPECIAL FLOOD HAZARD AREA — ZONE A

Note: These maps may not include all Special Flood Hazard Areas in the community. After a more detailed study, the Special Flood Hazard Areas shown on these maps may be modified, and other areas added.

TO DETERMINE IF FLOOD INSURANCE IS AVAILABLE IN THIS COMMUNITY, CONTACT YOUR INSURANCE AGENT, OR CALL THE NATIONAL FLOOD INSURANCE PROGRAM, AT (800) 638-6620, OR (800) 424-8872.

001086


ZONE A
ZONE A
ZONE A
ZONE A
ZONE A
ZONE A
SITE
Dam
Dam
Creek
Creek
Sand
Rock
TOLL
ROAD
ST LOUIS
8
9
10
15
16
17
20
21
22
27
29
32
33
34
16
48
ity of Bristow
EA NOT INCLUDED)

001087

5616286

REFERENCE 18

PREFACE

DEPARTMENT OF COMMERCE
H. Hodges, Secretary

WEATHER BUREAU
F. W. Reichelderfer, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture



WASHINGTON, D.C.

NOTICE
Rainfall frequency information for durations of 1 hour and less for the Central and Eastern States has been superseded by NOAA Technical Memorandum NWS HYDRO 35 Five to Sixty-Minute Precipitation Frequency for the Eastern and Central United States. This publication (Accession No. PB 272-111/AS) is obtainable from:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

THIS ATLAS IS OBSOLETE FOR THE FOLLOWING 11 WESTERN STATES: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

NOAA ATLAS 2: PRECIPITATION-FREQUENCY ATLAS OF THE WESTERN UNITED STATES (GPO: 11 Vols., 1973) supersedes the Technical Paper 40 data for these states.

All but 3 of the 11 state volumes are out of print, and no reprint is presently planned.

Institutions in the eleven western states likely to have copies of these volumes for their state for public inspection are:

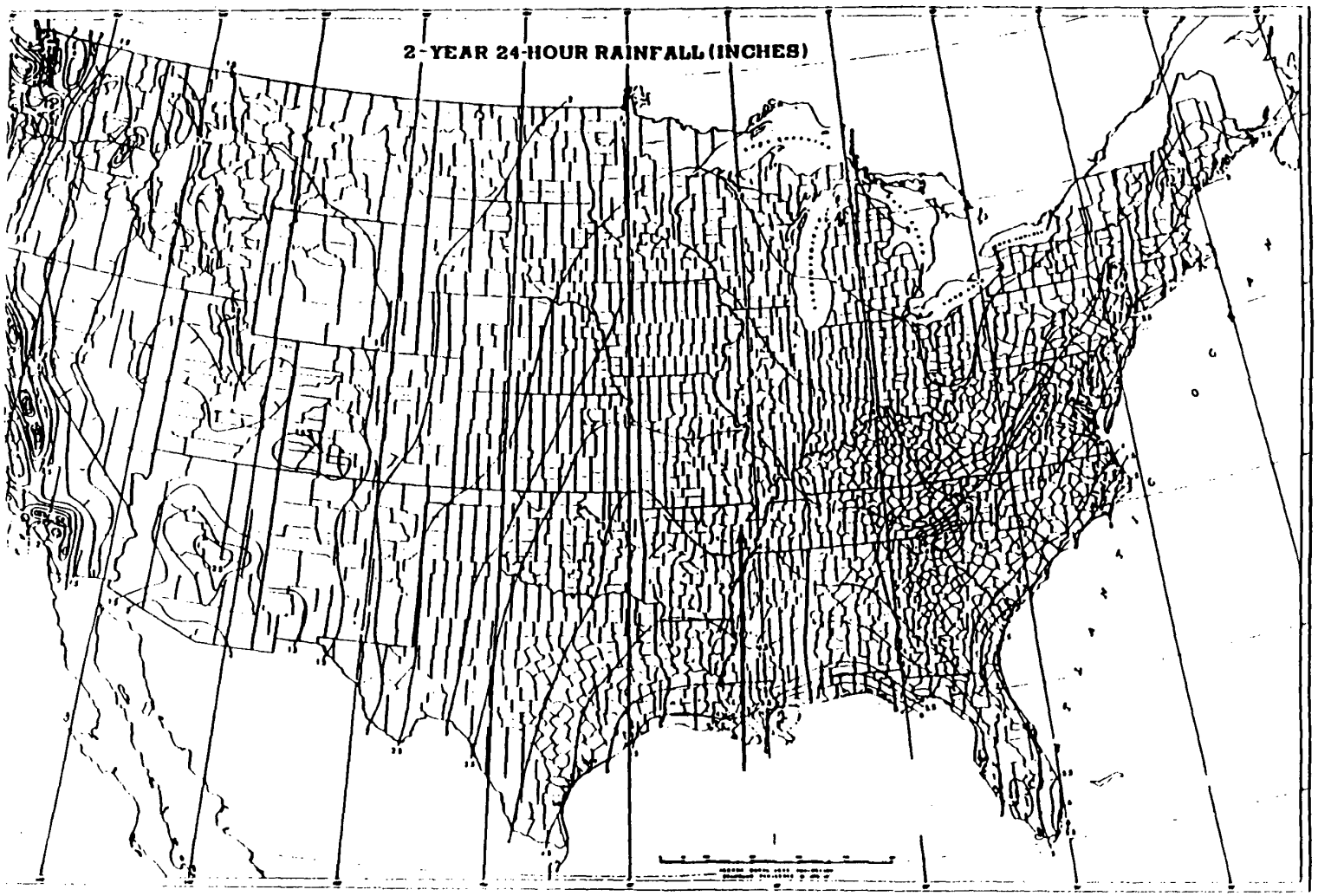
US Department of Agriculture Soil Conservation Service Offices
US Army Corps of Engineers Offices
Selected University Libraries
National Weather Service Offices (may also have volumes for adjacent states).
National Weather Service Forecast Offices (may have all eleven volumes)

Elsewhere, libraries of universities where hydrology and meteorology degree programs are offered may shelve some of the eleven volumes.

The three volumes in print as of 1 Jan 1983 at the GPO are:

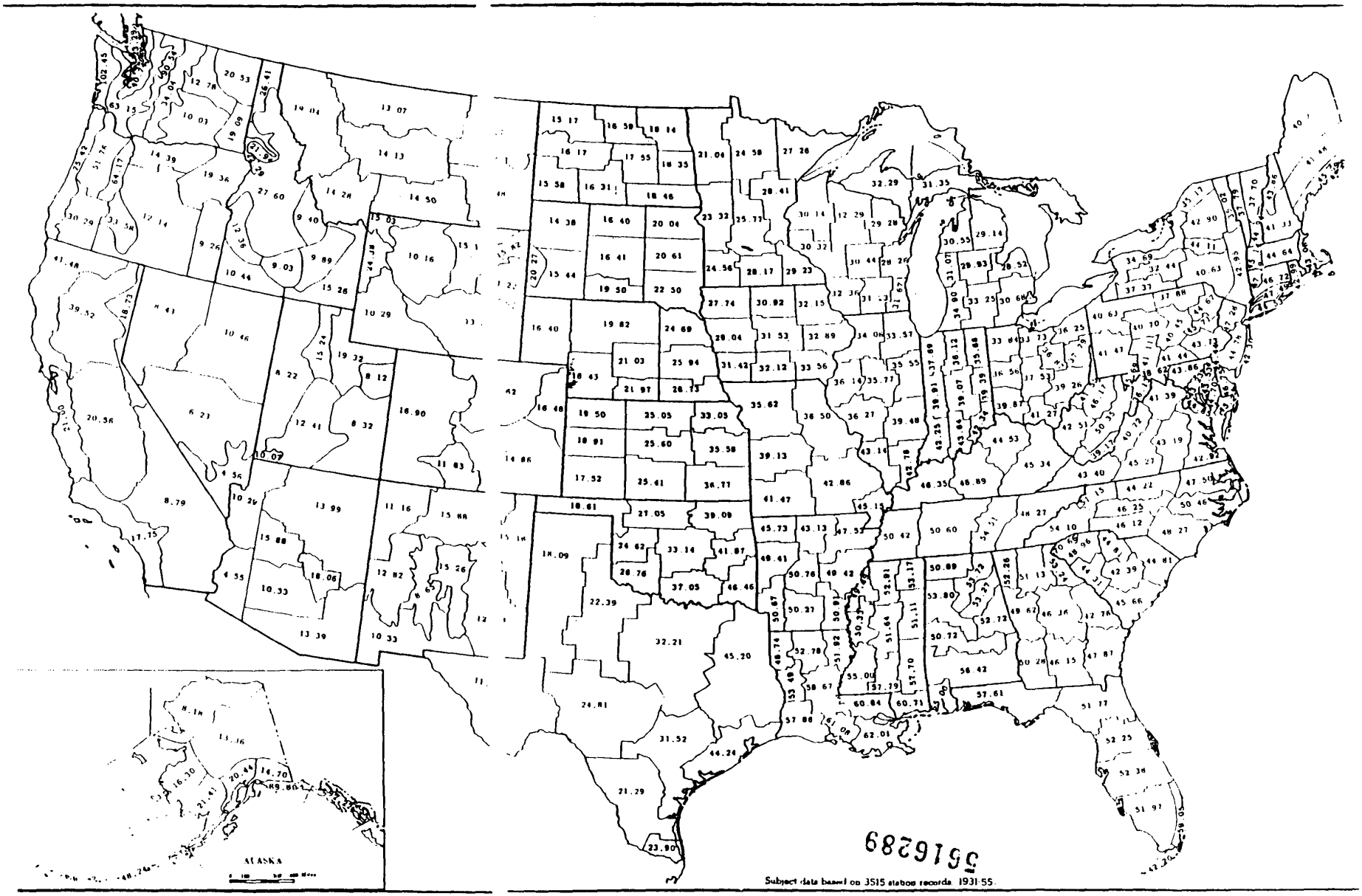
Vol	State	GPO Stock Number	Price
IV	New Mexico	003-017-00158-0	$10.00
VI	Utah	003-017-00165-3	12.00
VII	Nevada	003-017-00167-0	9.50

27829199
001089



56162288

MEAN ANNUAL TOTAL PRECIPITATION (inches) BY STATE CLIMATIC DIVISIONS



001091

5616290

REFERENCE 19

WESTON
PHONE CONVERSATION RECORD

ORIGINATOR

Diane G. Williams

X ORIGINATOR RECEIVED CALL

_ ORIGINATOR PLACED CALL

5616291

CONVERSATION WITH: **DATE:** 02/21/97

NAME: Rebecca Pool
Water Quality Division
Oklahoma Department of Environmental Quality

TIME: 11:20

PHONE: (405) 271-5205 **W.O. NO.:** 04606-056-026-0600

SUBJECT: Wilcox Oil Company - Downstream drinking water intakes.

NOTES: Ms. Pool returned my call and left a message on my voice mail, stating that no drinking water intakes are located in the watershed that included Sand Creek and the Little Deep Fork Creek. All drinking water in the area is obtained from groundwater sources.

FILE: 04606056026

TICKLE FILE:

FOLLOW-UP-BY:

COPY/ROUTE TO:

FOLLOW-UP-ACTION:

5916292

REFERENCE 20

CROSS - REFERENCE TARGET

DRAWING OUT REFER TO 35MM FILM

ROY WESTON

5616293

Pull out 1

Box # 75

CROSS - REFERENCE TARGET

DRAWING OUT REFER TO 35MM FILM

ROY WESTON

5616294

Pull out 1

Box # 75

5616295

REFERENCE 21

WESTON
PHONE CONVERSATION RECORD

ORIGINATOR

Diane G. Williams

_ ORIGINATOR RECEIVED CALL

X ORIGINATOR PLACED CALL

5616296

CONVERSATION WITH: **DATE:** 02/26/97

NAME: Mark Ambler
Oklahoma Fish and Wildlife **TIME:** 14:00

PHONE: (918) 683-1031 **W.O. NO.:** 04606-056-026-0600

SUBJECT: Wilcox Oil Company - Downstream fisheries.

NOTES: I asked Mr. Ambler if any fishing activities occur in Sand Creek or the Little Deep Fork Creek. He stated that limited fishing occurs on private lands in both creeks.

FILE: 04606056026

TICKLE FILE:

FOLLOW-UP-BY:

COPY/ROUTE TO:

FOLLOW-UP-ACTION:

5616297

REFERENCE 22

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5612998

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Series 1950, No. 5

460280—59——1

Issued May 195

001100

by a good cover of native grass, but they may erode slightly if overgrazed.

Collinsville and Talihina soils, sloping (4 to 12 percent slopes) (Ce).—The soils in this mapping unit are shallow and stony. About 60 percent of the acreage is Collinsville loam, which occupies the crests of ridges or low hills that are capped with sandstone. About 40 percent is Talihina clay loam, which occurs on the slopes below the Collinsville soils, where shale and interbedded sandstone and shale outcrop. The two soils usually occur in narrow bands that are too small to separate on the map. Tall grasses, mainly little bluestem and side-oats grama, are dominant, but some short grasses, mainly buffalograss and hairy grama, grow on the Talihina soils. Some areas are thinly covered with scrubby post oak, elm, and mesquite.

Profile of Talihina clay loam, about 3 miles west of Kiefer:

0 to 8 inches, olive-gray or dark grayish-brown clay loam; strong granular structure; crumbly and friable when moist, very hard when dry; has numerous sandstone fragments on the surface; slightly acid.
8 to 30 inches+, pale-olive or olive slightly weathered shale that contains thin layers of light-gray or brown clay and silty shale; neutral.

The Collinsville soil is described under Collinsville and Bates soils, gently sloping.

On slopes below areas of Collinsville stony loam, the Talihina soil has numerous sandstone fragments ranging up to 2 feet in diameter on the surface.

Use and management (Capability unit VIs–1).—The soils of this unit should not be cultivated, because they are very low in productivity. Most of the area is used for grazing. These soils are in the Shallow prairie range site. They produce moderate amounts of fairly nutritious grasses, but they are commonly overgrazed late in the summer or in long dry periods. The soils are droughty because they are so shallow. Runoff is moderate to rapid.

Collinsville and Talihina soils, strongly sloping (12 to 20 percent slopes) (Cf).—This mapping unit occurs in narrow valleys, on escarpments, and on hills dissected by natural stream channels. The soils are shallower than those in the sloping phase of Collinsville and Talihina soils, and the surface is stonier.

These soils are less than 8 inches deep over bedrock. The vegetation is a thin stand of grasses, mainly little bluestem, grama, and buffalograss. Mesquite and post oak trees are scattered over the area and form a fairly thick cover along stream channels and next to sandy forested areas.

In some places, limestone underlies the thin soil profile. Included in the mapping unit are areas of Sogn and Vernon soils, which are reddish brown and overlie red clay and shale. These areas are so small and so intermixed with the other soils that they cannot be mapped separately, and the soils are not described separately in this report.

Use and management (Capability unit VIs–1).—This unit is unfit for any use except grazing. It is in the Shallow prairie range site. It has a low carrying capacity. Grazing should be controlled carefully because these soils erode easily.

Darnell series

These very shallow acid soils developed over reddish sandstones under forest. They are too shallow for cropland and are used mainly for woodland pasture.

460280—59——2

Darnell soils have a thin grayish-brown sandy surface soil a few inches thick. A thin light-brown or light-yellow sandy subsurface layer overlies sandstone at depths of 5 to 20 inches. Sandstone outcrops are common. Most areas have a few to numerous loose sandstone fragments on the surface.

In Creek County, Darnell soils are mapped only in mixed mapping units with either Pottsville or Stephenville soils.

Darnell and Pottsville soils, sloping (4 to 12 percent slopes) (Da).—This is an extensive mapping unit that occupies the greater part of the sloping, forested areas of the county. It consists of very shallow, more or less sandy and stony, acid soils that overlie slightly acid to neutral reddish or yellowish interbedded sandstone, silty or sandy shale, and shale. About 55 percent of the acreage is Darnell stony fine sandy loam, and about 35 percent is Pottsville stony loam. Small areas of Stephenville fine sandy loam and spots of Talihina soils are scattered through this mapping unit.

The native vegetation was a scrub forest of blackjack and post oaks. Some elm and hickory trees and scattered coarse grasses, mainly bluestems, also grew in these places. Surface drainage is rapid. Internal drainage is moderate in the Darnell soils, but it is very slow in the Pottsville soils.

Profile of Darnell stony fine sandy loam under native scrubby forest on a slope of about 7 percent, about 5 miles west of Bristow in the SW¼SW¼ sec. 33, T. 16 N., R. 8 E.:

0 to 4 inches, dark grayish-brown fine sandy loam; very friable when moist, nearly loose when dry; numerous small and large sandstone fragments in the soil and on the surface; slightly acid.
4 to 8 inches, light-brown fine sandy loam; nearly loose when dry; contains fragments of partly weathered sandstone; medium to slightly acid.
8 inches+, red or reddish-yellow sandstone bedrock; slightly acid.

The combined thickness of the two layers of fine sandy loam ranges from 5 to 20 inches within a distance of a few feet. In some places a 3- to 5-inch subsoil of reddish sandy clay loam overlies the bedrock.

Profile of Pottsville stony loam about 5 miles west of Bristow in the NW¼SW¼ sec. 33, T. 16 N., R. 8 E.:

0 to 3 inches, dark grayish-brown loam; weak granular structure; friable; numerous fragments of sandstone, up to 18 inches in diameter, on the surface; slightly acid.
3 to 8 inches, yellowish-red clay loam; crumbly when moist, sticky and plastic when wet; medium acid.
8 to 30 inches +, mottled olive-brown and yellow or red and olive-yellow shaly clay; contains interbedded layers of brown sandstone; medium acid.

The thickness of the upper two horizons combined ranges from about 3 to 15 inches, and the texture ranges from fine sandy loam to clay. The bedrock that underlies this soil is sandstone in some places, and in other places, sometimes only a few feet away, it is slightly weathered shale.

Use and management (Capability unit VIs–2).—This unit is entirely unsuitable for cropland and of low value for woodland or woodland pasture. It is in the Shallow savanna range site. Most of this unit is still under a cover of native scrubby blackjack oak, post oak, elm, and hickory trees. It erodes very easily even under its natural cover of forest. The shallowness of the profile is the result of normal erosion.

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massive to weakly granular structure; friable when moist, very hard and compact when dry; slightly acid.
15 to 24 inches, grayish-brown heavy clay, mottled with yellowish red and yellowish brown; weak blocky structure; very compact and very sticky when moist, extremely hard when dry; very slowly permeable; medium acid.
24 to 42 inches+, mottled gray and light olive-brown heavy clay; very sticky and stiff when wet; very slowly permeable; slightly acid in upper part, neutral in lower part.

The thickness of the surface soil ranges from about 10 to 18 inches, and the texture ranges from very fine sandy loam to loam. On a few low sandy mounds the surface soil is fine sandy loam 18 to 30 inches thick. The third layer ranges from dense clay to compact, slowly permeable sandy clay; in places it contains pockets and lenses of sandy loam.

Use and management (Capability unit IIs–1).—This soil is not susceptible to erosion. Fertility is low to moderate. The soil remains wet and cold late in the spring, and when it dries the surface soil crusts and bakes. If the soil is not worked at exactly the right moisture content, large clods form that make it very difficult to maintain a good seedbed.

This soil is not well suited to most common field crops, but it is moderately well suited to native hay or pasture. Most of it is now used for pasture. About one-third of the soil is used for crops, mostly cotton, corn, and sorghums. This soil is in the Claypan prairie range site.

Oil-waste land

Oil-waste land (Oa).—The areas mapped in this miscellaneous land type have been practically ruined for agricultural use by oil and salt-water waste from oil wells. They are more or less gullied and eroded and are almost bare of vegetation. They range in size from about one acre to several acres.

Use and management (Capability unit VIII).—This land is of no value for crops or pasture in its present condition. Some of the less strongly sloping and less severely gullied areas may eventually be revegetated by natural means if no more oil or salt-water waste is dumped on them.

Okemah series

These soils have developed from weakly alkaline shales and clays under a cover of grass in nearly level to gently sloping shallow valleys. They are moderately well drained, dark colored, and slightly acid. They have a dark-colored, crumbly and granular surface soil and upper subsoil. Their lower subsoil is mottled olive-yellow and gray compact clay.

Okemah soils are not mapped separately in Creek County. They are closely associated with soils of the Dennis series in some places and with soils of the Woodson series in others, and are mapped in units with soils of one or the other of these series. The Woodson soils differ from the Okemah soils in being dark gray and having a claypan. The Dennis soils, where they are associated with the Okemah soils, lie in slightly higher positions and have developed from less clayey materials. The Dennis soils are browner than the Okemah soils, and they have more rapid runoff and internal drainage.

A profile of an Okemah soil as mapped with the Woodson soils is described under Okemah and Woodson clay loams, and a profile of an Okemah soil as mapped with Dennis soils is described under Dennis and Okemah loams, gently sloping.

Okemah and Woodson clay loams (0 to 1 percent slopes) (Ob).—These two soils occur intermixed in small areas or separately in areas of several acres. Woodson clay loam occupies the nearly level, usually lower-lying parts of shallow valleys, and Okemah clay loam the gently sloping, slightly higher surrounding areas, but the two soils are so closely associated that it is not practical to map them separately. They merge with little or no difference in surface appearance. The parent materials of both soils are olive or olive and yellow weakly alkaline clays and shales. The mapping unit occurs mostly in shallow valleys near Kiefer, Mounds, and Edna. Runoff is slow to moderate, and internal drainage is very slow. The native vegetation was tall grasses, mainly big bluestem, little bluestem, side-oats grama, and Indiangrass.

Profile of Okemah clay loam near Mounds in the SW¼SW¼ sec. 17, T. 16 N., R. 12 E.:

0 to 15 inches, dark-gray clay loam, lower part slightly mottled with brown; granular and friable when moist, very hard when dry; surface crusts in cultivated fields on drying; slightly acid.
15 to 20 inches, dark grayish-brown silty clay loam, slightly mottled with brownish yellow and strong brown; crumbly and friable when moist, sticky and plastic when wet; moderately permeable; slightly acid.
20 to 35 inches, mottled grayish-brown and light olive-brown heavy clay; very sticky and stiff when wet, extremely hard when dry; compact and very slowly permeable; neutral.
35 to 48 inches+, mottled light-gray and olive-yellow clay; very compact; very slowly permeable; weakly alkaline.

The texture of Okemah clay loam ranges from loam to clay loam. The depth to the heavy clay layer ranges from 18 to 25 inches. A few shotlike concretions of iron oxide occur in the two clay layers.

Profile of Woodson clay loam about 1 mile south of Kiefer in the SW¼SW¼ sec. 28, T. 17 N., R. 12 E.:

0 to 12 inches, dark-gray clay loam; the 6-inch plow layer is slightly lighter in color; crumbly and friable when moist, very hard when dry; surface crusts on drying; slightly acid.
12 to 22 inches, dark-gray heavy clay, faintly mottled with brown; very compact claypan; very sticky and stiff when wet; very slowly permeable; slightly acid to neutral.
22 to 38 inches, dark grayish-brown clay, mottled with yellowish brown; very compact; extremely hard when dry; very slowly permeable; weakly alkaline.
38 to 46 inches+, mottled gray, olive-brown, and yellowish-brown clay or shaly clay; contains a few crystals of gypsum and small shotlike concretions of iron oxide; alkaline but not calcareous.

The thickness of the surface soil ranges from 10 to 14 inches. Considerable mottling occurs in the upper subsoil in the areas that grade toward the Okemah soil.

Some small areas of Parsons silt loam near Kiefer are included in this mapping unit. These areas have a dark grayish-brown silt loam surface soil 12 inches thick, which rests on a mottled grayish-brown, strong-brown, and pale-yellow claypan subsoil. The Parsons soils are not extensive enough in Creek County to be mapped separately and are not described in this report.

Use and management (Capability unit I–4).—The two soils in this mapping unit are the darkest colored and finest textured soils of the prairies. They are the most fertile and productive soils for common field crops that occur in the uplands of this county. Okemah clay loam is slightly more productive than Woodson clay loam. Both soils have a moderately high water-holding capacity

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These inclusions consist of 10 to 18 inches of light-brown fine sandy loam over dark gravish-brown silt loam or clay loam, overlain by recent deposits of lighter colored, sandier soil materials.

Use and management (Capability unit IIIw–1).—This soil is moderately productive. It is easily worked and fairly resistant to drought. It is not susceptible to erosion, but some material may be deposited on the surface by flood waters. Cropping is hazardous because most areas are flooded several times a year.

This soil is moderately well suited to crops and, in spite of the flood hazard, about one-fifth of the area is cropped. Cotton, corn, and sorghums are the chief crops. This soil is well suited to pasture, and about one-third is used for this purpose. Nearly half has been left in native forest. The soil is in the Loamy bottom-land range site.

Reinach series

Soils of the Reinach series developed from alkaline to calcareous, reddish, silty to moderately sandy alluvium on low, nearly level stream terraces. They are moderately productive soils and easily worked. They are well suited to all general crops of this area, including alfalfa.

The Reinach soils have a brown to reddish-brown friable surface soil and a silty to moderately sandy subsoil. They are similar to the Yahola soils that occur on the present flood plains, but the Reinach soils lie a little higher and are above ordinary overflow. Their surface soil is darker than the Yahola surface soil, and is alkaline, though usually noncalcareous. Only one Reinach soil is mapped in Creek County.

Reinach very fine sandy loam (0 to 1 percent slopes) (Ra).—This soil occurs on low terraces or benches a few feet higher than the flood plains of the Cimarron River. It developed from reddish, silty to moderately sandy, alkaline, calcareous alluvial sediments. Prairie grasses and scattered elm, hackberry, pecan, and oak trees were the native vegetation. Runoff is slow, and internal drainage is moderate to rapid.

Profile of Reinach very fine sandy loam about 3½ miles north of Drumright on a low terrace of the Cimarron River:

0 to 14 inches, reddish-brown very fine sandy loam; the 6-inch plow layer is light reddish brown; weak granular structure; very friable; neutral.
14 to 46 inches+, light reddish-brown very fine sandy loam that contains thin strata of reddish-brown and brown silt loam in lower part; friable; very permeable; neutral.

The surface soil ranges from brown to light reddish brown in color and from fine sandy loam to silt loam in texture. Some small areas next to more strongly sloping Teller soils have an overwash of light-brown, slightly acid fine sandy loam, 4 to 10 inches thick.

Use and management (Capability unit I–1).—This soil is well suited to crops and pasture. Most of it is cultivated. Corn, cotton, sorghums, and alfalfa are the principal crops. This soil is easily worked and is not susceptible to erosion. It is in the Loamy bottom-land range site.

Roebuck series

Soils of this series consist of only slightly modified clayey alluvium washed from prairie soils that developed over redbeds. The alluvial deposits are alkaline to weakly calcareous. The native vegetation was forest. Both runoff and internal drainage are slow to very slow. Most areas are too poorly drained or too frequently flooded to be suitable for cropping unless artificially drained and protected from floods.

The surface soil is reddish brown. The subsoil is reddish clay, slightly mottled with brown and gravish brown. Roebuck clay is the only soil of this series that is mapped in Creek County.

Roebuck clay (0 to 1 percent slopes) (Rb).—This soil occupies parts of the flood plain of the Deep Fork River, where the channel is choked or partly filled by silting. It developed from clayey and silty, alkaline or calcareous, reddish alluvium. A native forest of elm, hackberry, oak, willow, pecan, and cottonwood covers these areas.

This is a poorly drained soil. Both runoff and internal drainage are very slow. The level flood plains are subject to frequent floods. This soil is not susceptible to erosion, but most areas are rapidly being covered with silt.

Profile of Roebuck clay:

0 to 20 inches, reddish-brown clay; moderately crumbly when moist, very sticky and plastic when wet; weakly alkaline.
20 to 45 inches+, reddish-brown heavy clay, slightly mottled with other shades of brown and some grayish brown; very sticky and stiff when wet, very hard when dry; slowly permeable; weakly calcareous.

Small areas have recent deposits of reddish-brown or brown, alkaline or calcareous, somewhat stratified clay loam and clay, 5 to 15 inches thick. In some places the subsoil below about 30 inches is stratified with brown clay loam and dark-gray calcareous clay.

Use and management (Capability unit Vw–1).—Nearly all of this soil is still in woodland. It is very fertile and would be highly productive if it were drained and protected from flooding, but drainage and flood protection are so difficult as to be almost impossible. Clearing underbrush and culling trees to allow native pecan orchards and bermudagrass pastures to develop may be practical. This soil is in the Heavy bottom-land range site.

Stephenville series

Soils of this series are of medium depth over the parent materials of soft reddish sandstone or interbedded sandstone and sandy shale. They developed under a scrubby forest of mixed blackjack oak and post oak. Scattered coarse grasses grew in open areas.

These soils are slightly acid. They have a light-colored friable sandy surface layer and a yellowish-red or red friable sandy clay loam subsoil. The subsoil grades into the parent material, usually at a depth of less than 3 feet.

The Stephenville soils occupy nearly level to moderately sloping areas and are closely associated with the very shallow Darnell soils. The two soils are similar in surface appearance, but the Stephenville soils are 20 to 36 inches deep and the Darnell soils are 5 to 20 inches deep over sandstone. Sandstone outcrops are common in both.

In this county, the Stephenville soils are mapped only in units with the Darnell soils. The two series have similar uses and are about equal in productivity.

Stephenville and Darnell fine sandy loams, gently sloping (2 to 4 percent slopes) (Sa).—Stephenville fine sandy loam occupies about 70 percent of this mapping unit. Small areas of Darnell fine sandy loam make up the other 30 percent. This unit is very extensive in the central, southern, and western parts of the county.

001103

These shallow to moderately deep upland soils developed over reddish-yellow to red sandstone or interbedded sandstone and sandy shale. The parent materials were slightly acid to neutral. The native vegetation was a thin to moderately thick forest of scrubby blackjack oak and post oak, and a thin ground cover of bluestem grasses. Both soils are well drained. Runoff is slow to moderate, but internal drainage is moderate to rapid.

Profile of Stephenville fine sandy loam, gently sloping, under a moderately thick cover of scrubby post oak and blackjack oak and bluestem grasses, about 2 miles east of Depew in the SW¼SW¼ sec. 9, T. 15 N., R. 8 E.:

0 to 4 inches, grayish-brown fine sandy loam; in plowed fields this layer is pale brown; weak granular structure; very friable; slightly acid.
4 to 12 inches, pale-brown light fine sandy loam; very friable when moist, nearly loose when dry; slightly acid.
12 to 28 inches, yellowish-red sandy clay loam; massive structure; crumbly and friable when moist, slightly sticky when wet; porous and permeable; medium acid.
28 to 35 inches, yellowish-red sandy clay loam, mottled with red; friable; permeable; contains small soft fragments of partly weathered sandstone; medium to slightly acid.
35 inches +, yellowish-red sandstone bedrock; slightly acid to neutral.

The depth to bedrock ranges from about 20 to 40 inches; normally it is less than 30 inches. A few small outcrops of the sandstone bedrock occur.

Profile of Darnell fine sandy loam in a cultivated field of about 2 percent slope, in the NW¼NW¼ sec. 16, T. 15 N., R. 8 E.:

0 to 10 inches, pale-brown light fine sandy loam; structureless; very friable when moist, nearly loose when dry; slightly acid.
10 to 16 inches, reddish-yellow fine sandy loam, slightly heavier in lower part; structureless; friable; lower part contains small fragments of partly weathered sandstone; medium acid.
16 inches +, reddish-yellow sandstone bedrock; neutral.

The depth of the Darnell soil ranges from about 5 to 20 inches. Most areas are between 8 and 15 inches deep. Small outcrops of sandstone bedrock occur here and there. The transition between the deeper Stephenville soil and the shallower Darnell soil is hardly noticeable; there is no change in slope or in color of the surface soil. Another profile of Darnell soil, as it typically occurs when associated with soils of the Pottsville series, is described under Darnell and Pottsville soils, sloping.

Use and management (Capability unit IIIe–2).—These soils are droughty and low in fertility. They are slightly to moderately susceptible to erosion if cultivated. Most of the cleared acreage has lost up to 20 percent of its surface soil through erosion. Some shallow gullies occur on the more strongly sloping cleared areas.

These soils are moderately well suited to crops and pasture. Yields are moderate under good management. Intensive management is needed to maintain or increase productivity.

About half of this mapping unit is cleared. Most of the cleared acreage has been abandoned for cropping, and it is now used for pasture. Cotton, peanuts, sorghums, corn, cowpeas, and sweetpotatoes are the principal crops. The pastures have a thin cover of three-awn grasses, bluestem grasses, and weeds. This unit is in the Sandy savanna range site. Nearly half of it is native woodland.

Stephenville and Darnell fine sandy loams, sloping (4 to 7 percent slopes) (Sb).—These soils are like Stephenville and Darnell fine sandy loams, gently sloping, except that the surface soil is somewhat thinner, the bedrock is nearer the surface, and outcrops of sandstone are more common. About 60 percent of the acreage consists of Stephenville soils and about 40 percent of Darnell soils.

Use and management (Capability unit VIe–1).—This land is not well suited to crops. It is droughty, low in natural productivity, and highly erodible if cultivated. Moderate yields of common field crops are produced when the soils are first cultivated, but yields decline rapidly.

More than half of this mapping unit is still in woodland. The remainder has been cleared, but little is still used for crops. Cotton, corn, sorghums, peanuts, and cowpeas are grown. Yields are about three-fourths as much as on the gently sloping soils. Most of the acreage that was cleared, cultivated, and abandoned is now in pasture. The vegetation is three-awn grass and weeds. This unit is in the Sandy savanna range site.

If these soils are cultivated, very careful management is needed. They should be terraced, stripcropped, and contour-cultivated, and erosion-resistant crops should be planted. Areas where the soils are too shallow to be terraced should be used for pasture.

Stephenville and Darnell fine sandy loams, sloping, severely eroded (4 to 7 percent slopes) (Sc).—The soils in this mapping unit have been so severely eroded that they are worthless for crops. Originally, they were like Stephenville and Darnell fine sandy loams, sloping, but erosion has removed much of the surface soil. Numerous gullies are now active; some cannot be crossed with tillage implements.

Use and management (Capability unit VIIe–2).—These soils were never well suited to crops, and now they are of no value for crops. All of the acreage has been cultivated, but most of it is now idle or in pasture. A thin stand of annual grasses and weeds furnishes poor grazing. It would take careful management to establish even moderately good pastures. Cotton, corn, sorghums, cowpeas, and peanuts are still grown on a few acres, but yields are low. This mapping unit is in the Eroded savanna range site.

Stidham series

The Stidham soils developed from acid sandy old alluvium on stream terraces under a mixed hardwood forest. They are low in natural fertility, but they are very responsive to management. They are well suited to fruits, special crops, and field crops.

Soils of this series have a light brownish-gray to pale-brown, friable, acid surface soil. The subsoil is yellowish-brown friable sandy clay loam, mottled with light gray and strong brown in the lower part.

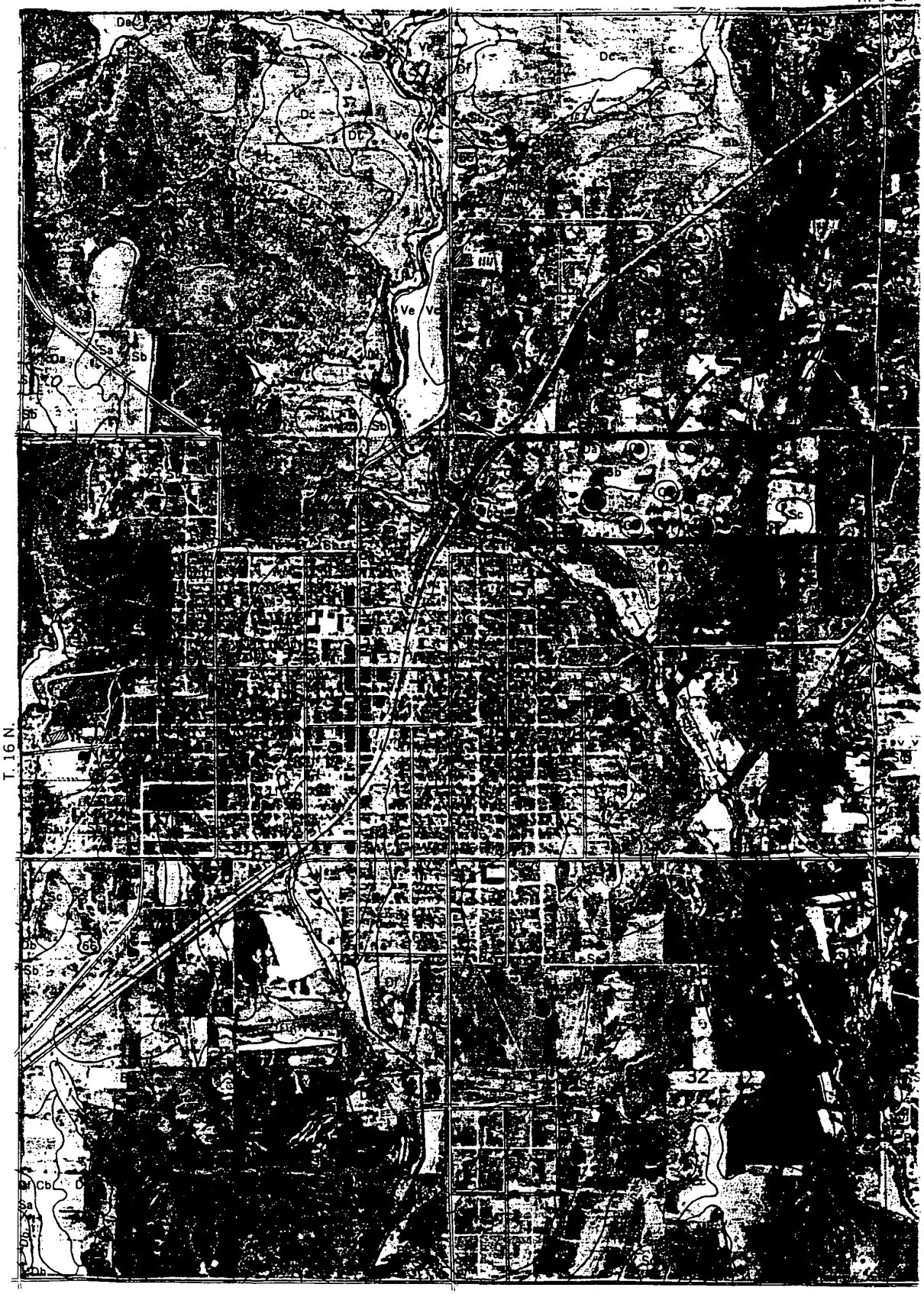
Stidham soils are closely associated with Dougherty soils, which have a reddish subsoil, and with Eufaula soils, which have no loamy subsoil within 4 feet of the surface. In Creek County, the Stidham soils are not mapped separately. They are mapped in units with soils of the Dougherty series. A profile of a Stidham soil is described under Dougherty and Stidham fine sandy loams, nearly level.

Talihina series

The Talihina soils developed from beds of slightly acid to neutral, gray, brown, and olive shale that included a little sandstone. They are very shallow, slightly acid

001104

R. 9 E.



Scale 1:20(

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REFERENCE 23



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ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

Robert M. White, Administrator

ENVIRONMENTAL DATA SERVICE

Woodrow C. Jacobs, Director

JUNE 1968

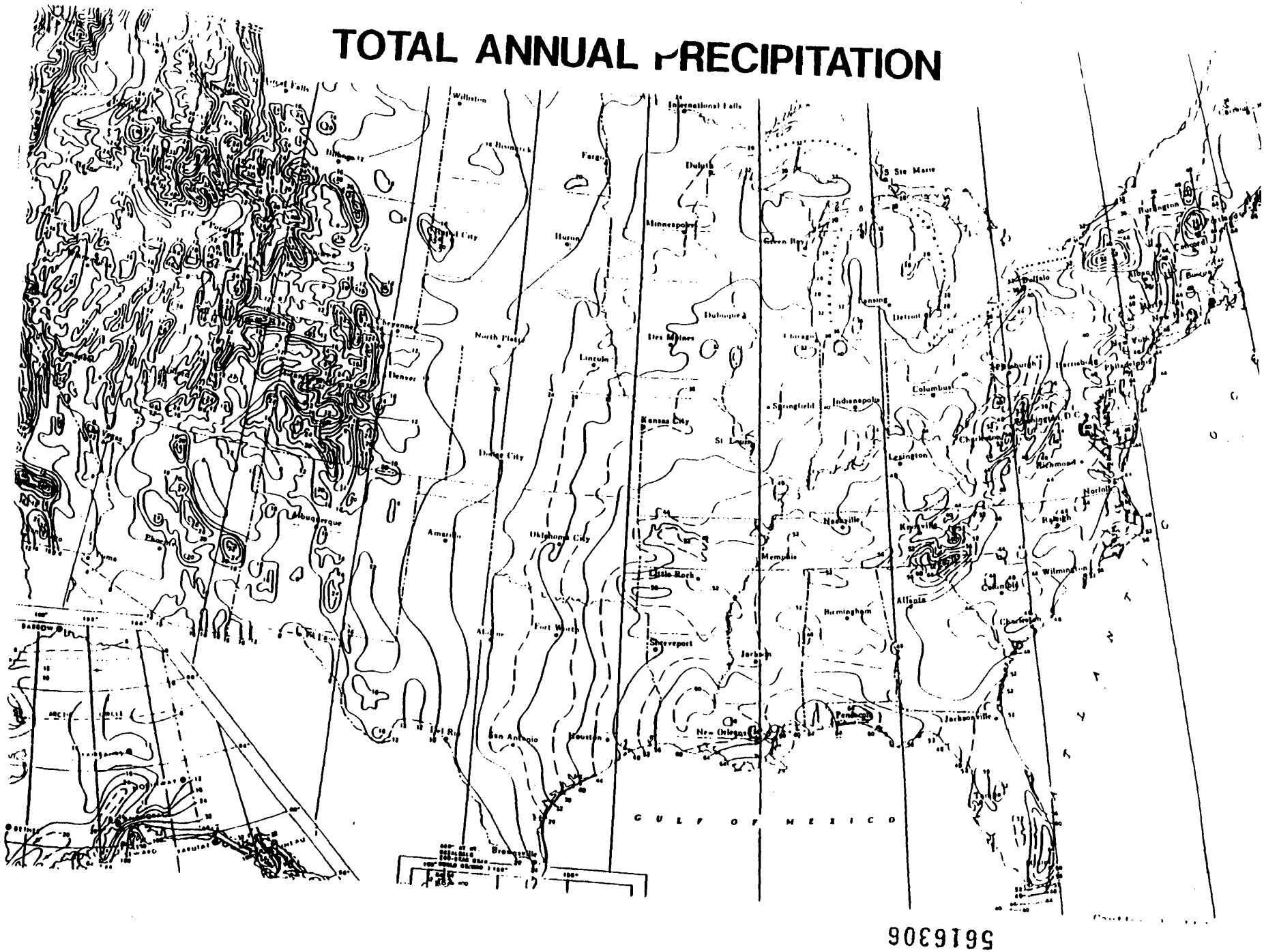
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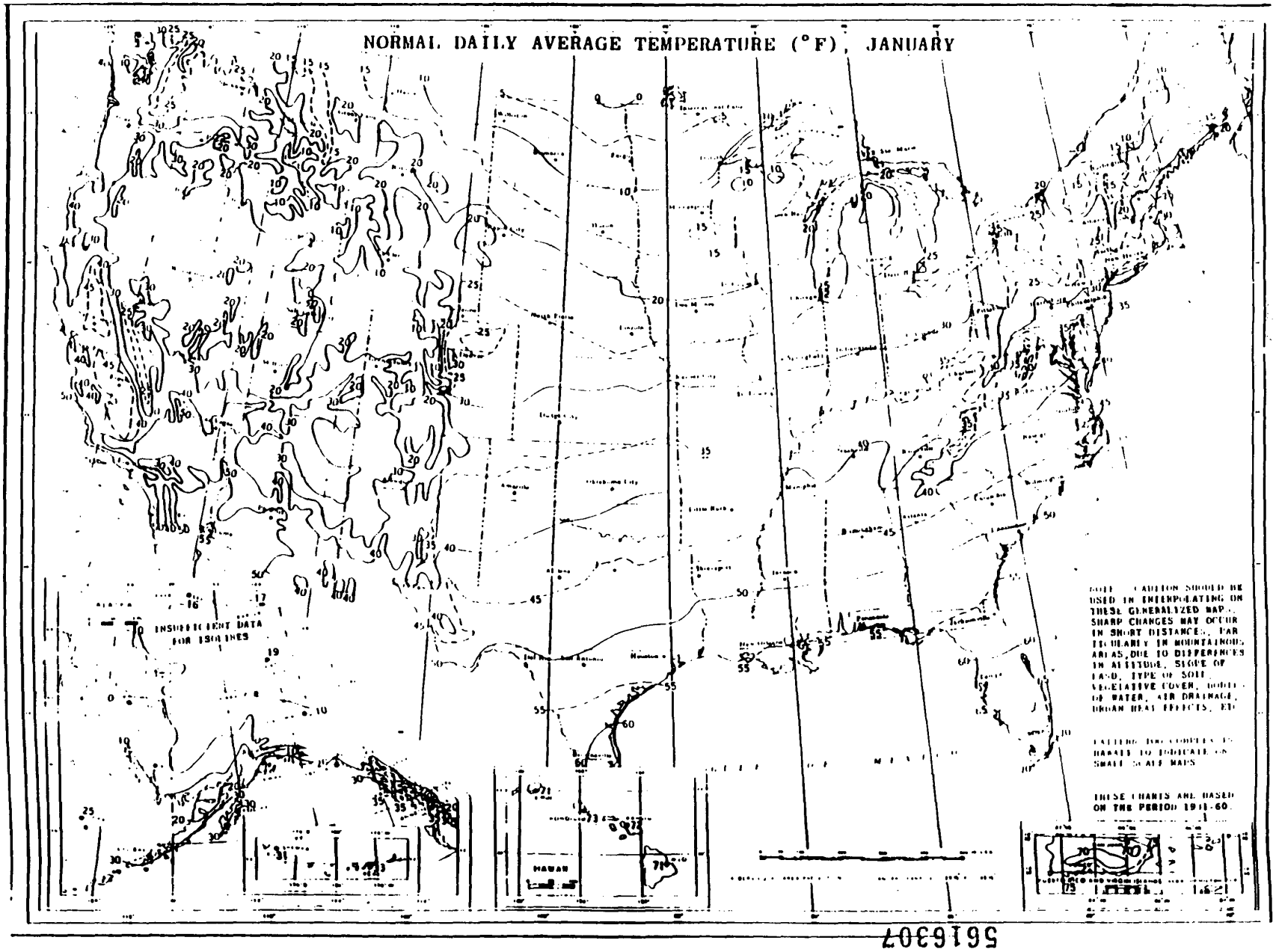
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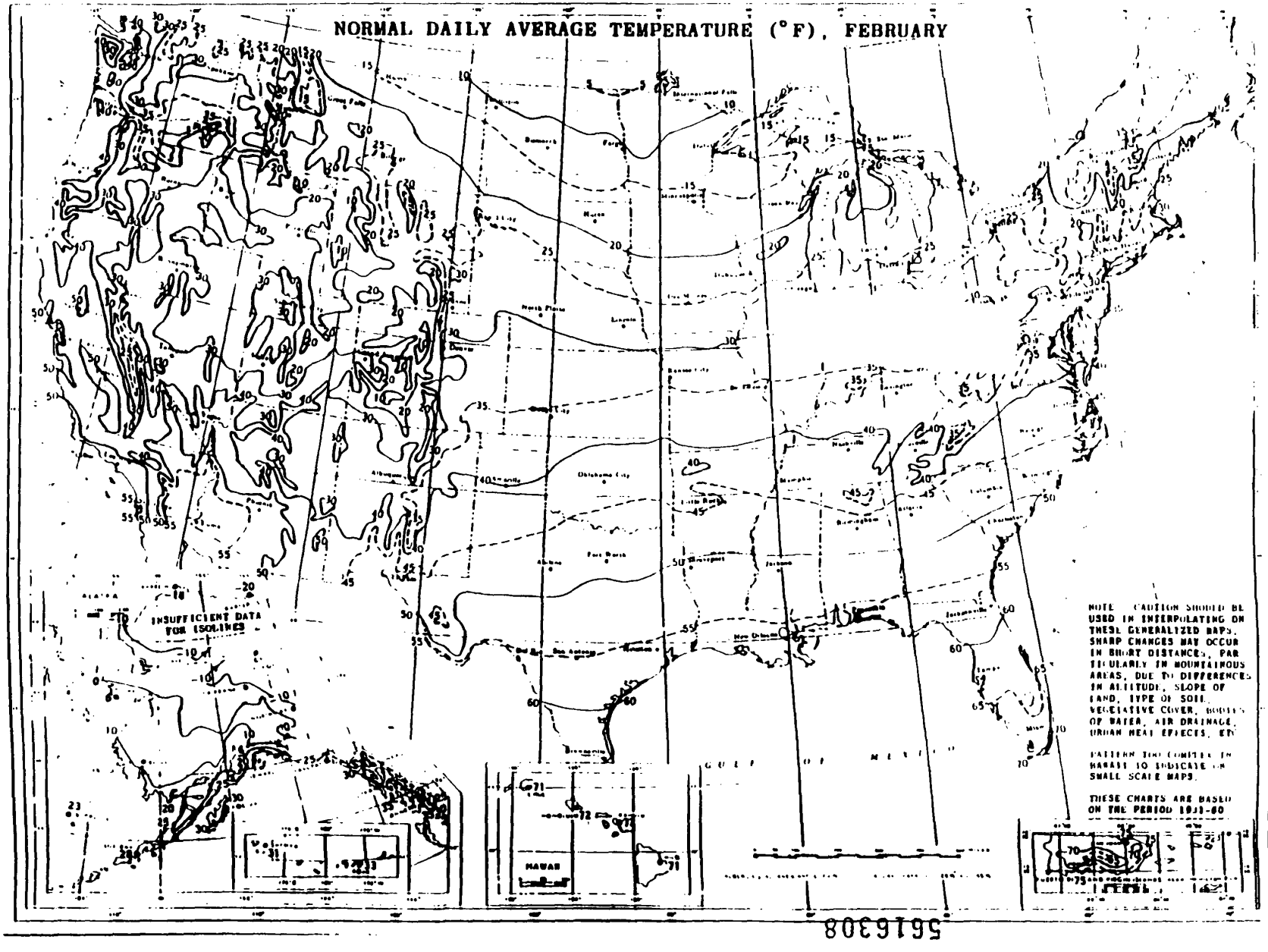
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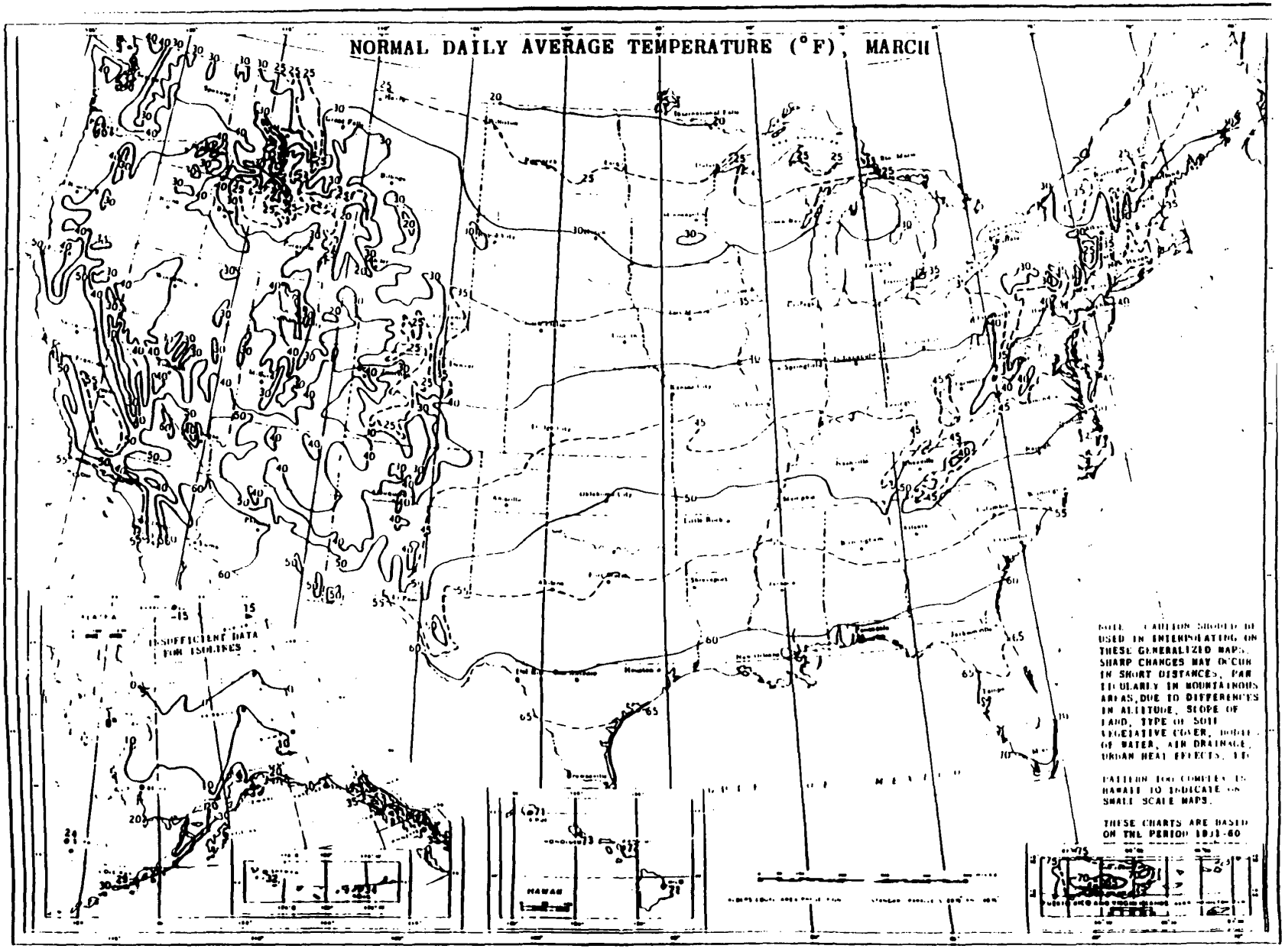

NORMAL DAILY AVERAGE TEMPERATURE (°F), JANUARY
INSUFFICIENT DATA FOR ISOLINES
HAWAII
NOTE: CAUTION SHOULD BE USED IN INTERPOLATING ON THESE GENERALIZED MAPS. SHARP CHANGES MAY OCCUR IN SHORT DISTANCES, PARTICULARLY IN MOUNTAINOUS AREAS, DUE TO DIFFERENCES IN ALTITUDE, SLOPE OF LAND, TYPE OF SOIL, VEGETATIVE COVER, NEARNESS OF WATER, AIR DRAINAGE, URBAN HEAT EFFECTS, ETC.
THESE CHARTS ARE BASED ON THE PERIOD 1931-60.

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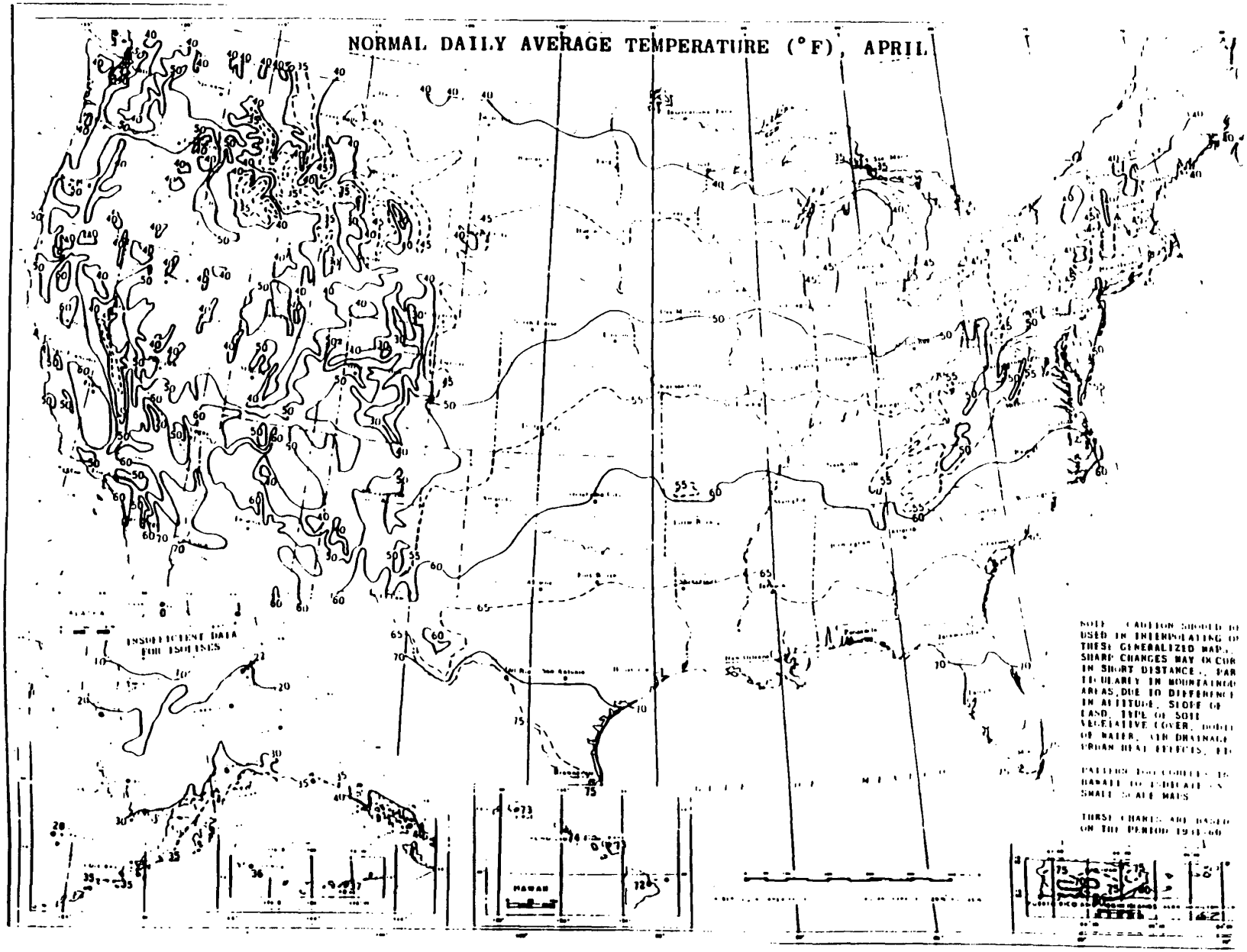


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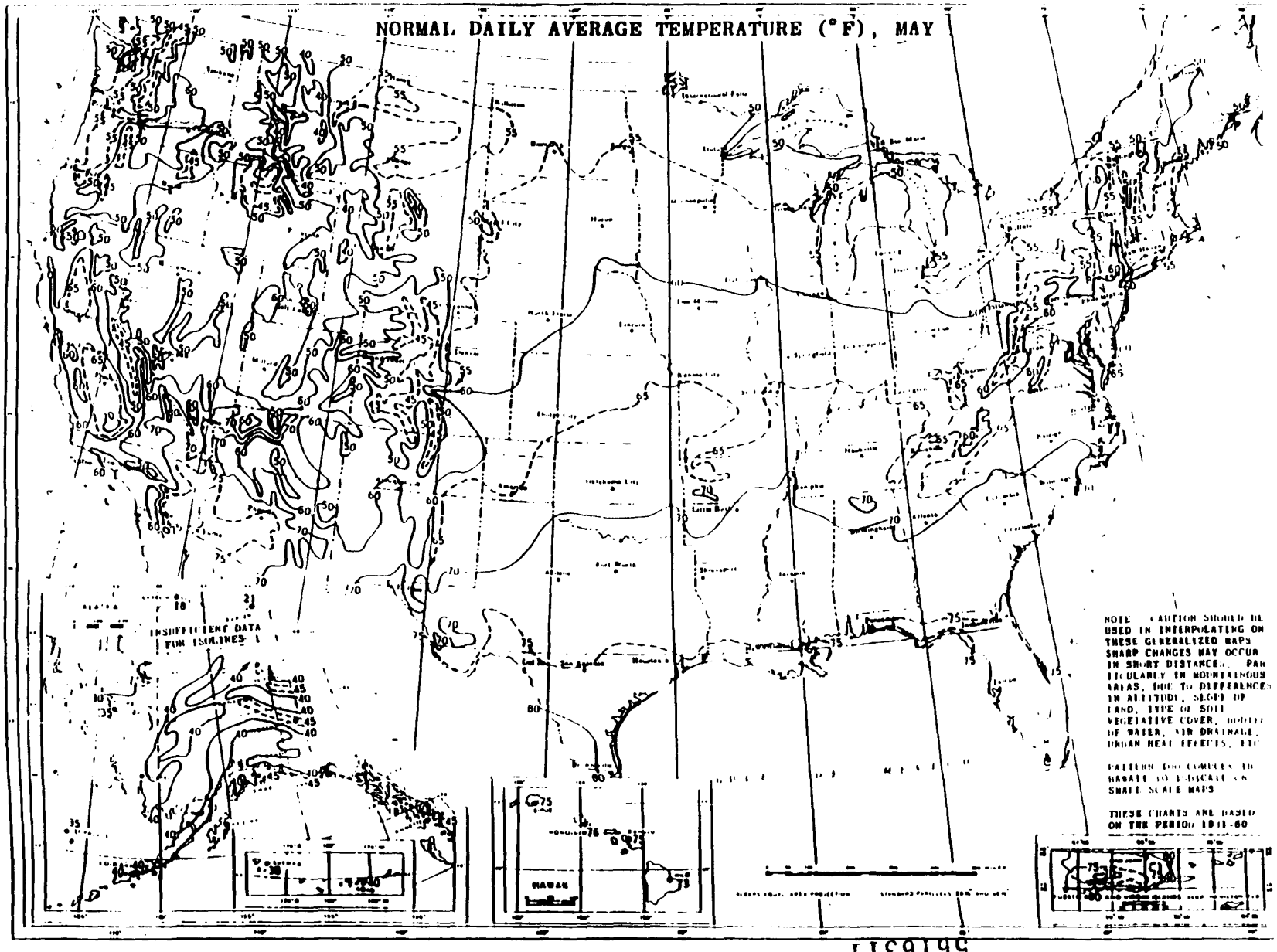
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THESE CHARTS ARE BASED ON THE PERIOD 1931-60

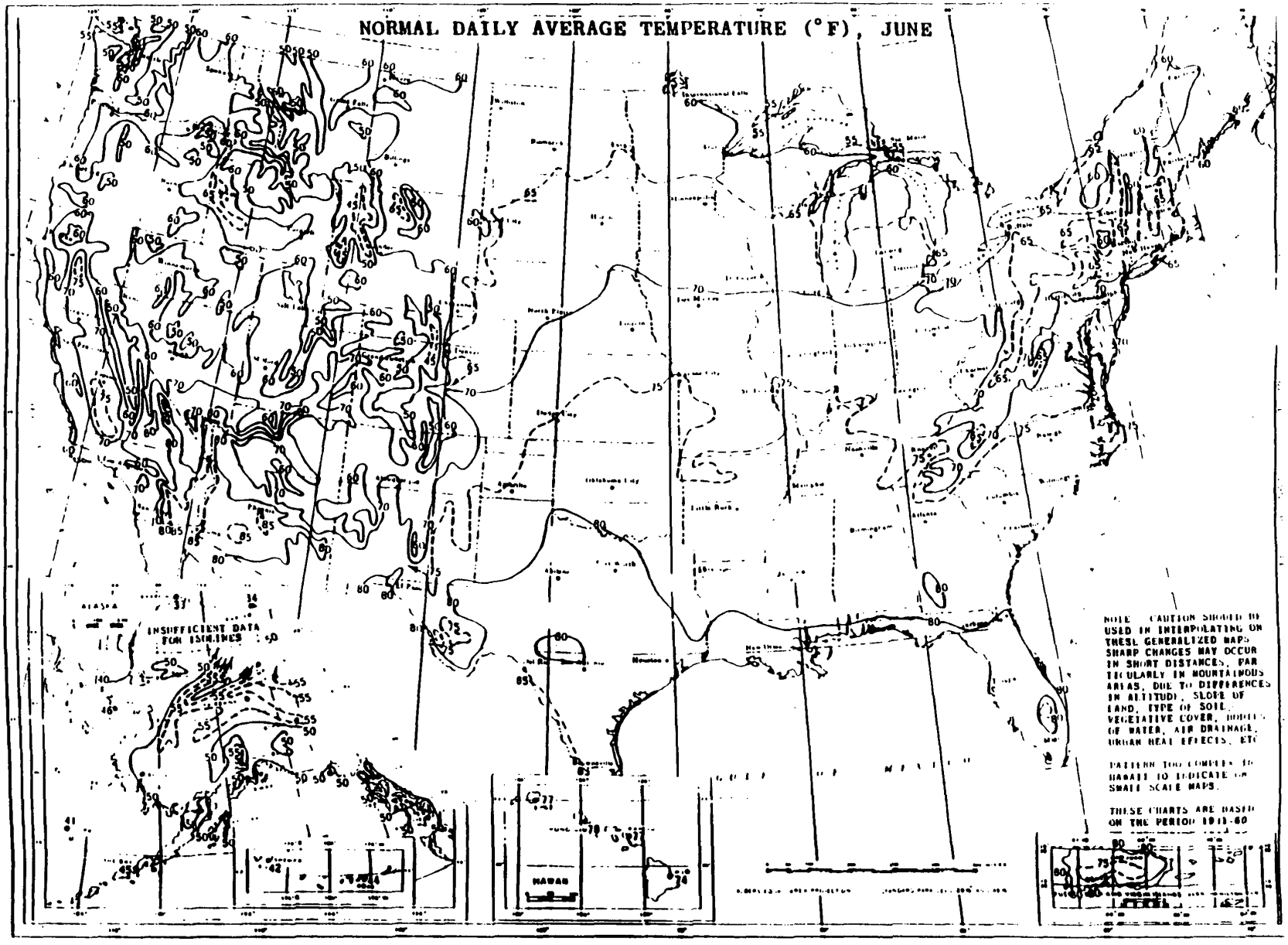
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INSUFFICIENT DATA FOR ISOLINES
HAWAII

5616310

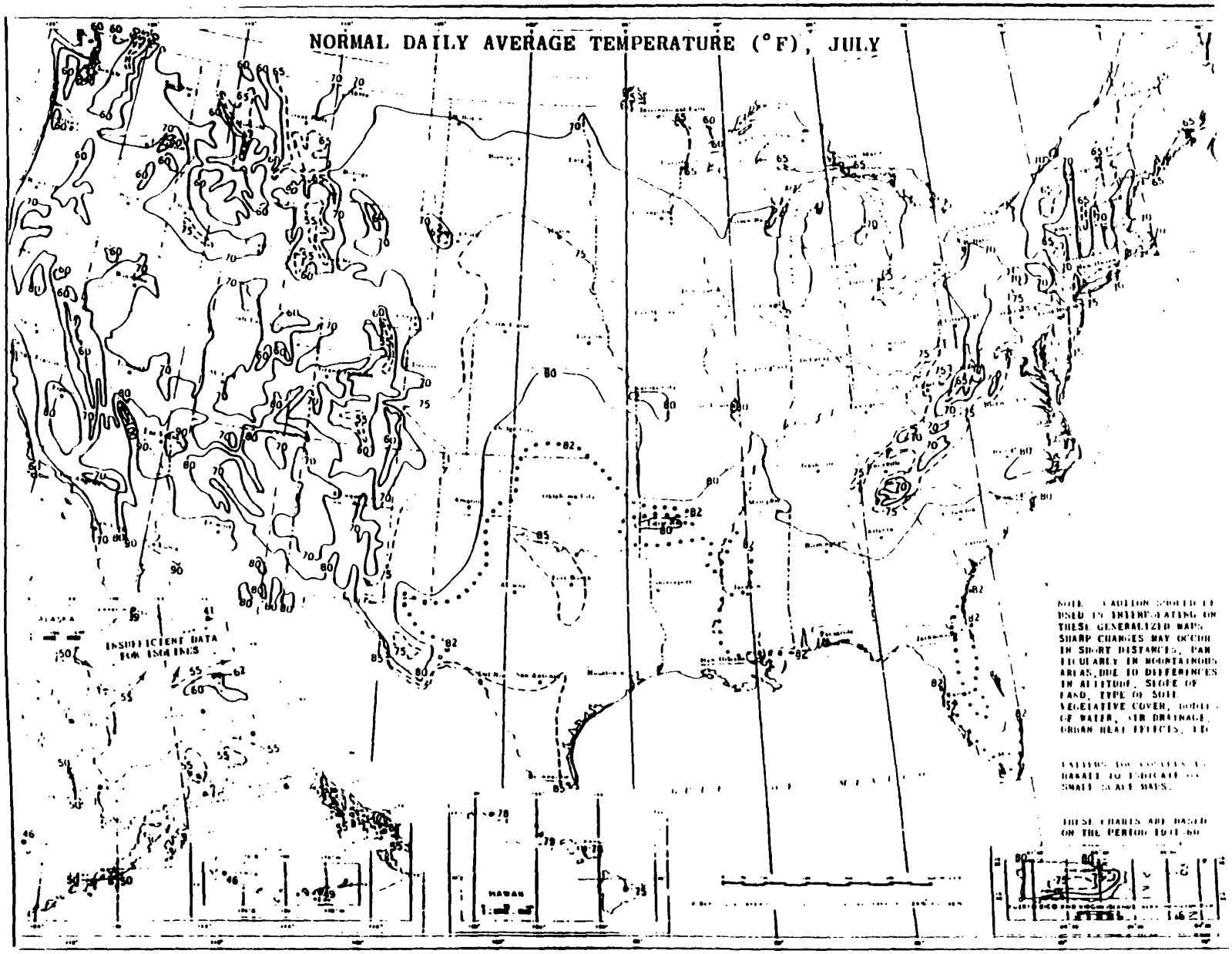

NORMAL DAILY AVERAGE TEMPERATURE (°F), MAY
INSUFFICIENT DATA FOR ISOLINES
NOTE: CAUTION SHOULD BE USED IN INTERPOLATING ON THESE GENERALIZED MAPS SHARP CHANGES MAY OCCUR IN SHORT DISTANCES. PAR TICULARLY IN MOUNTAINOUS AREAS, DUE TO DIFFERENCES IN ALTITUDE, SLOPE OF LAND, TYPE OF SOIL VEGETATIVE COVER, NEARNESS OF WATER, AIR DRAINAGE, URBAN HEAT EFFECTS, ETC
THESE CHARTS ARE BASED ON THE PERIOD 1911-60
HAWAII

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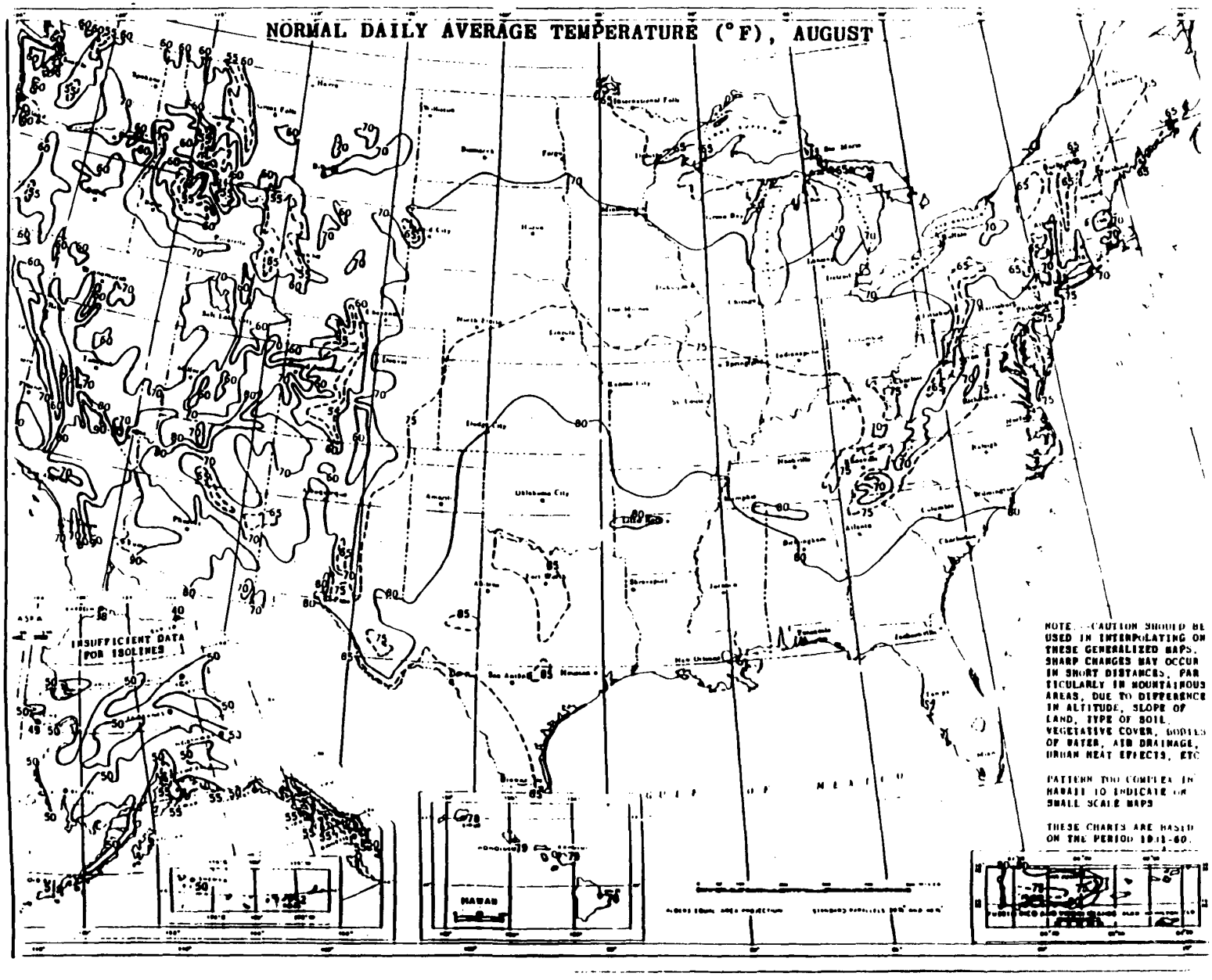


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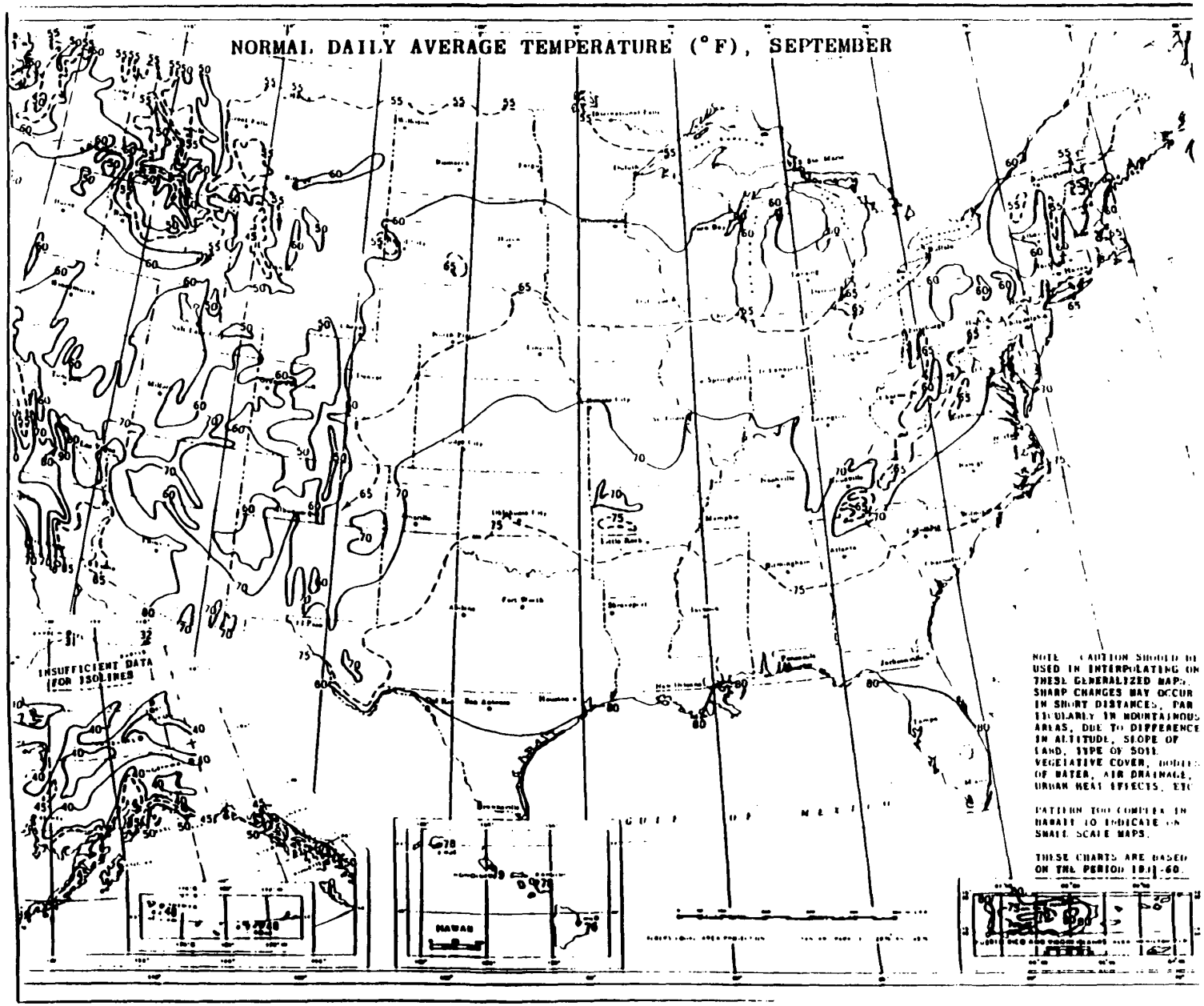
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INSUFFICIENT DATA FOR THIS AREA
HAWAII

5616313

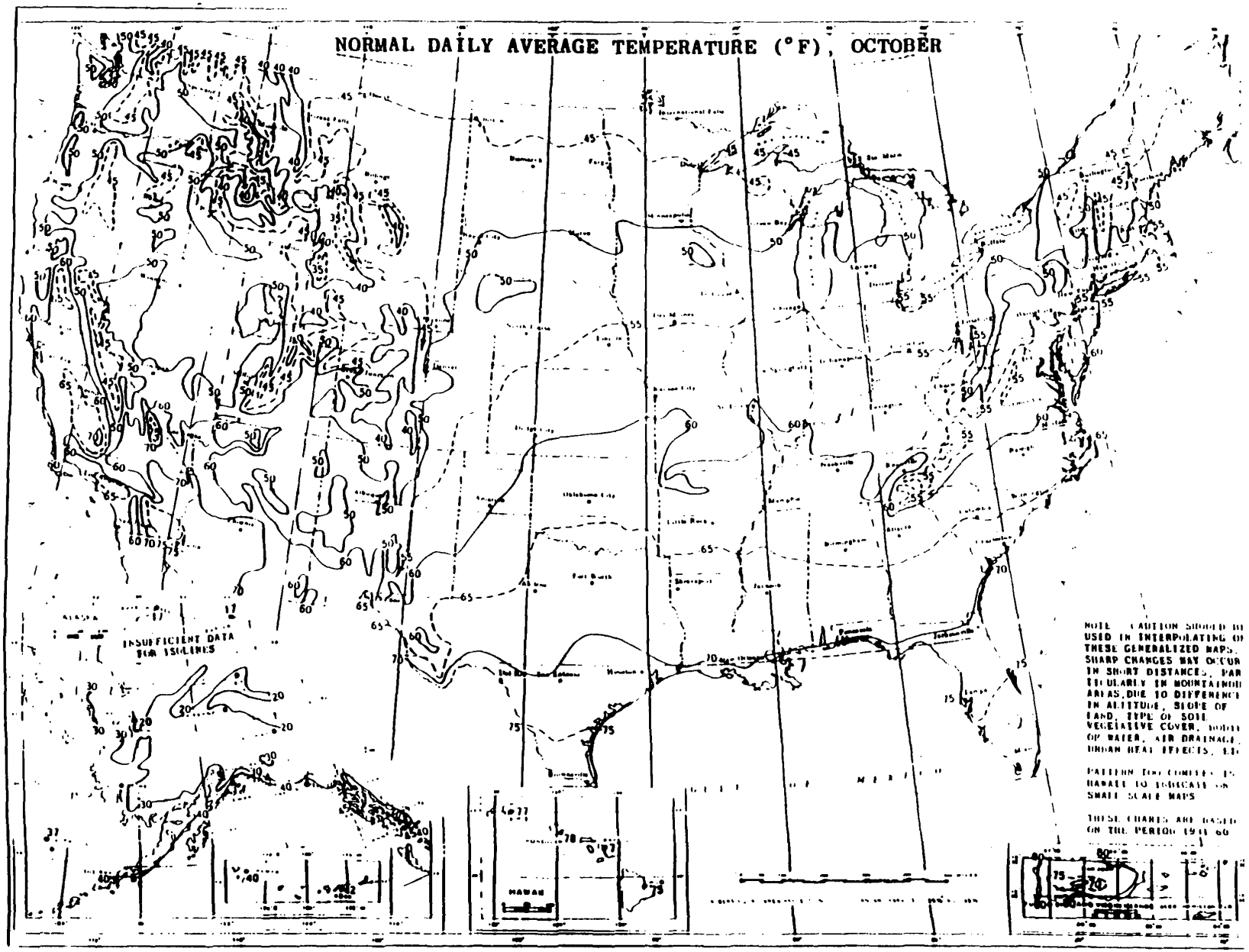

NORMAL DAILY AVERAGE TEMPERATURE (°F), AUGUST
INSUFFICIENT DATA FOR ISOLINES
NOTE.--CAUTION SHOULD BE USED IN INTERPOLATING ON THESE GENERALIZED MAPS. SHARP CHANGES MAY OCCUR IN SHORT DISTANCES, PARTICULARLY IN MOUNTAINOUS AREAS, DUE TO DIFFERENCE IN ALTITUDE, SLOPE OF LAND, TYPE OF SOIL, VEGETATIVE COVER, BODIES OF WATER, AIR DRAINAGE, URBAN HEAT EFFECTS, ETC.
PATTERN TOO COMPLEX IN HAWAII TO INDICATE ON SMALL SCALE MAPS
THESE CHARTS ARE BASED ON THE PERIOD 1931-60.
HAWAII

5616314

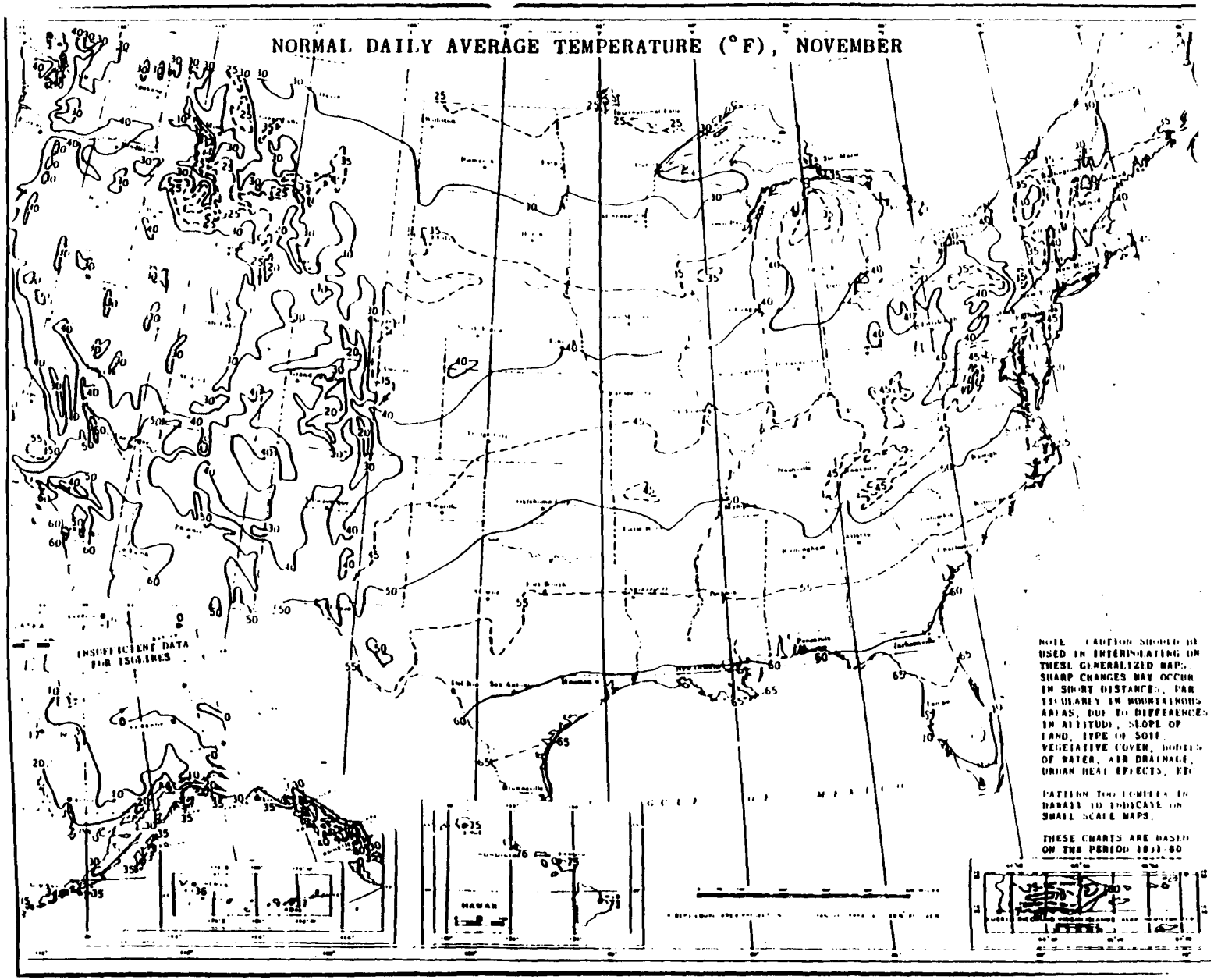


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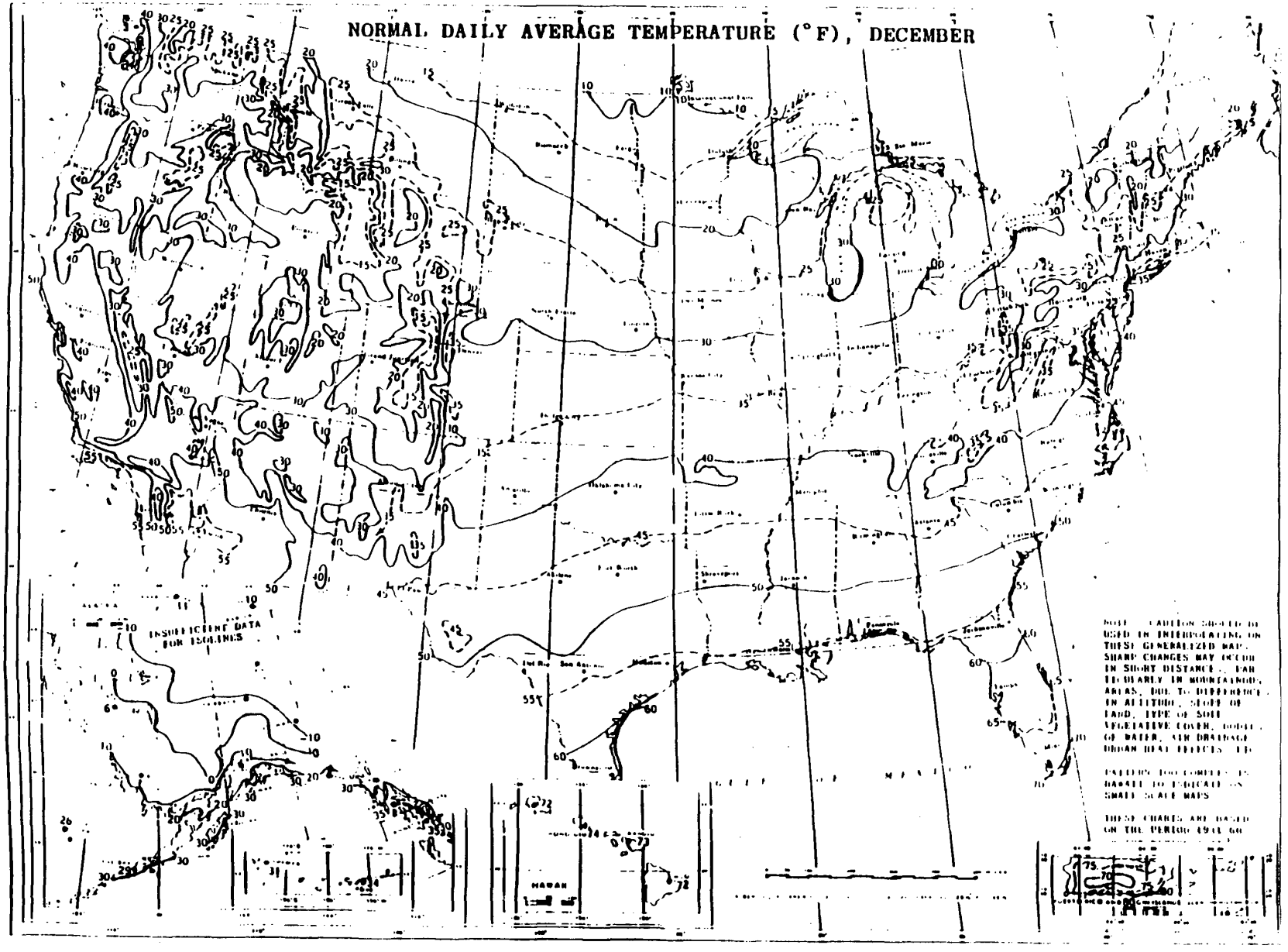
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NORMAL DAILY AVERAGE TEMPERATURE (°F), OCTOBER
INSUFFICIENT DATA FOR ISOLINES
HAWAII

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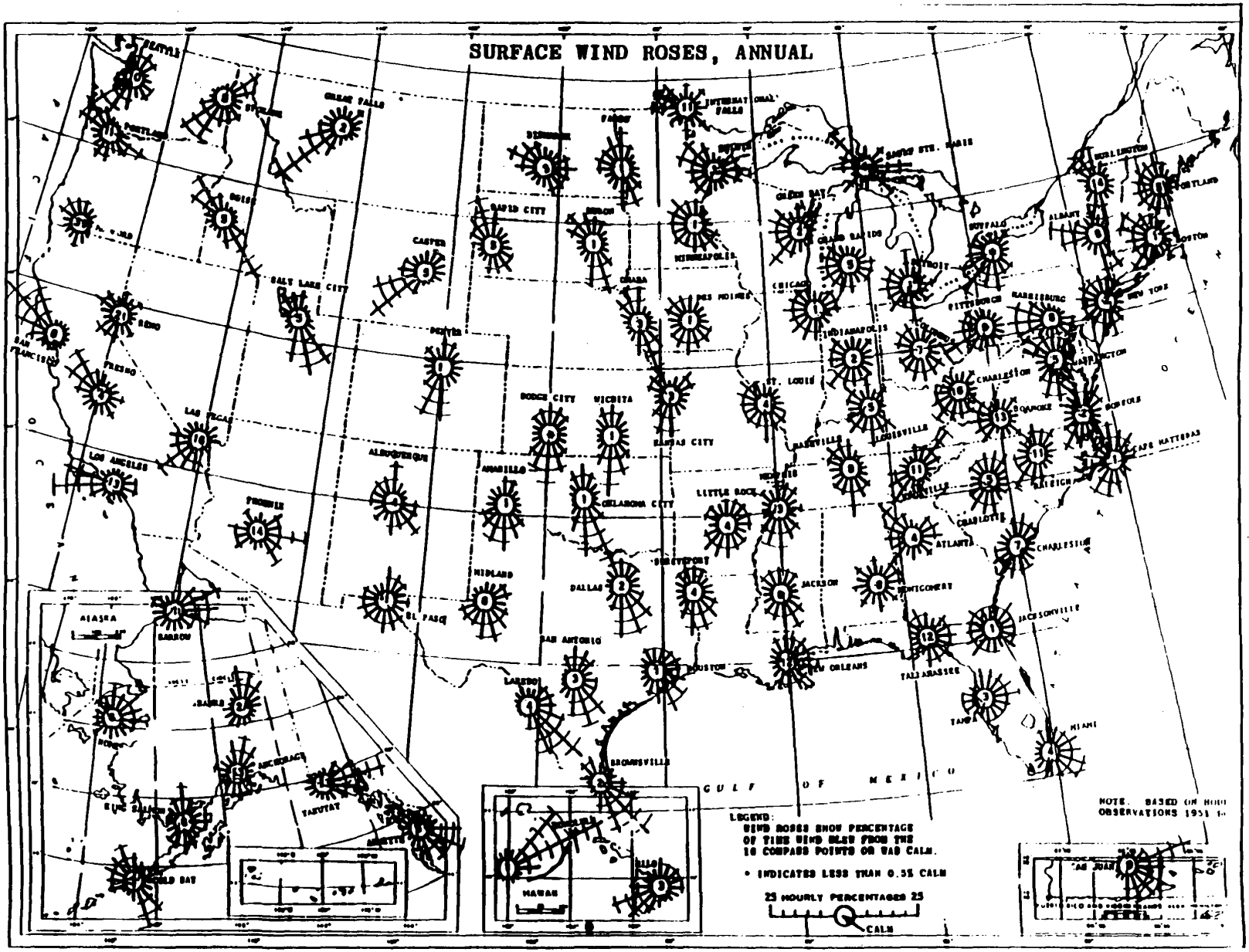

NORMAL DAILY AVERAGE TEMPERATURE (°F), NOVEMBER
INSUFFICIENT DATA FOR ISOLINES
HAWAII
NOTE: CAUTION SHOULD BE USED IN INTERPOLATING ON THESE GENERALIZED MAPS. SHARP CHANGES MAY OCCUR IN SHORT DISTANCES, PARTICULARLY IN MOUNTAINOUS AREAS, DUE TO DIFFERENCES IN ALTITUDE, SLOPE OF LAND, TYPE OF SOIL, VEGETATIVE COVER, BODIES OF WATER, AIR DRAINAGE, URBAN HEAT EFFECTS, ETC.
PATTERN TENDENCIES IN HAWAII TO INDICATE ON SMALL SCALE MAPS.
THESE CHARTS ARE BASED ON THE PERIOD 1931-60

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SURFACE WIND ROSES, ANNUAL
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SPOKANE
GREAT FALLS
BOISE
SALT LAKE CITY
RENO
SAN FRANCISCO
FRESNO
LOS ANGELES
LAS VEGAS
ALBUQUERQUE
PHOENIX
EL PASO
CASPER
RAPID CITY
PUEBLO
DENVER
BOISE CITY
WICHITA
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SAN ANTONIO
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MIAMI
CHARLESTON
ALASKA
BARROW
NOME
BETHEL
KING SALMON
MCGRATH
FAIRBANKS
TANANA
NORTHWAY
FORT YUKON
KOTZEBUE
GOLD BAY
HAWAII
HILO
SAN JUAN
GULF OF MEXICO
LEGEND:
WIND ROSES SHOW PERCENTAGE OF TIME WIND BLEW FROM THE 16 COMPASS POINTS OR WAS CALM.
• INDICATES LESS THAN 0.5% CALM
25 HOURLY PERCENTAGES 25
CALM
NOTE: BASED ON HOURLY OBSERVATIONS 1951 to

5616319

Document Type: PREscore

EPA Contract No. 68-W9-0015

Work Assignment No.: 56-6JZZ

Site Name: WILCOX OIL COMPANY

EPA ID#: OKD001010917

5616320

is located in the CONFIDENTIAL FILES for the above said Work Assignment No.