

**RCRA Facility Investigation/Remedial Investigation Report for
Gunsite 720 Rubble Pit Unit (631-16G) - March 1996**

by

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**RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT**

FOR THE

GUNSITE 720 RUBBLE PIT UNIT (631-16G) (U)

PREPARED BY:

WESTINGHOUSE SAVANNAH RIVER COMPANY

SAVANNAH RIVER SITE

AIKEN, SOUTH CAROLINA

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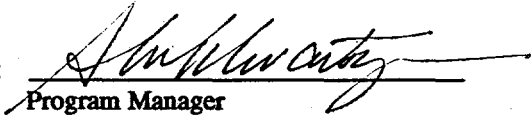
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Revision 1
RFI/RI Report for the
GUNSITE 720 (631-16G) RUBBLE PIT UNIT

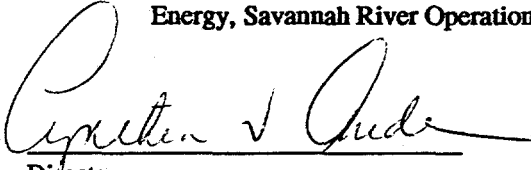
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TABLE OF CONTENTS

EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1-1
1.1 Purpose	1-1
1.1.1 SRS RCRA 3004(u)/CERCLA Program Description	1-1
1.2 Site Background	1-3
1.2.1 Site Description	1-3
1.2.2 Site History	1-5
1.3 Previous Investigations	1-6
1.3.1 Preliminary Unit Evaluation	1-6
1.3.1.1 Existing Literature and Information	1-8
1.3.1.2 RFI/RI Literature Review Checklist	1-8
1.3.1.3 RFI/RI Site Reconnaissance	1-8
1.3.1.4 Preliminary Unit Evaluation Results	1-8
1.3.1.4.1 Waste Characteristics	1-9
1.3.1.4.2 Unit/Disposal Area Characteristics	1-9
1.3.2 Unit Screening	1-10
1.3.2.1 Evaluation of Unit Screening Options	1-10
1.3.2.2 Unit Screening Geophysical Survey	1-11
1.3.2.3 Unit Screening/Confirmation Soil Analysis Sampling	1-11
1.3.2.3.1 Soil Sampling	1-11
1.3.2.3.2 Soil Analytical Results	1-12
1.3.2.3.3 Trenching Observations	1-17
1.3.2.4 Unit Screening Conclusions	1-18
1.4 Report Organization	1-20
2.0 STUDY AREA INVESTIGATION	2-1
2.1 Surface Feature Investigation	2-1

2.2 Contaminant Source Investigation.....	2-1
2.3 Meteorological Investigation.....	2-1
2.4 Surface Water and Sediment Investigation.....	2-2
2.5 Soil/Vadose Zone Investigations.....	2-3
2.5.1 Magnetic Survey.....	2-3
2.5.2 Ground Penetrating Radar Survey.....	2-6
2.5.3 Soil Sampling.....	2-6
2.5.4 Conclusions from the Magnetic, GPR and Soil Surveys.....	2-9
2.5.5 Identification of Human Health Chemicals of Potential Concern (COPCs).....	2-9
2.5.5.1 Chemicals of Potential Concern.....	2-12
2.6 Groundwater Investigation	2-14
2.7 Human Population Surveys.....	2-15
2.8 Ecological Investigation.....	2-15
3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA	3-1
3.1 Surface Features.....	3-1
3.2 Meteorology.....	3-1
3.2.1 Regional Climatology.....	3-1
3.2.2 Temperature and Humidity.....	3-1
3.2.3 Precipitation and Evapotranspiration.....	3-2
3.2.4 Wind.....	3-3
3.2.5 Thunderstorms.....	3-3
3.2.6 Ice and Snow.....	3-5
3.2.7 Fog.....	3-5
3.2.8 Tornadoes.....	3-5
3.2.9 Hurricanes	3-6
3.3 Surface Water Hydrology	3-6

3.4 Geology of SRS.....	3-6
3.5 Hydrogeology.....	3-11
3.6 Geology and Hydrology of the Gunsite 720 Rubble Pit Unit.....	3-13
3.7 Demography and Land Use.....	3-13
3.7.1 Demographics.....	3-13
3.7.2 Land Use.....	3-14
4.0 NATURE AND EXTENT OF CONTAMINATION.....	4-1
4.1 Results of Data Usability Evaluation.....	4-1
4.2 Results of Site Characterization.....	4-1
5.0 CONTAMINANT FATE AND TRANSPORT.....	5-1
6.0 RISK ASSESSMENT.....	6-1
6.1 Human Health Assessment.....	6-1
6.2 Ecological Assessment.....	6-1
7.0 SUMMARY AND CONCLUSION.....	7-1
7.1 Summary.....	7-1
7.2 Conclusion.....	7-1
8.0 REFERENCES.....	REF-1

APPENDIX A - Technical Memoranda on Field Activities

APPENDIX B - Analytical Data and QA/QC Evaluation Results

APPENDIX C - Risk Assessment Methods

LIST OF FIGURES

Number	Title	Page
1-1	Location of Gunsite 720 in Relation to Major SRS Facilities.....	1-4
1-2	Soil Gas Sample Locations.....	1-7
1-3	Unit Screening Soil Sample Locations.....	1-13
2-1	Topographic Map of Gunsite 720 Rubble Pit Unit.....	2-2
2-2	Station Location for the 1986 Magnetic Survey.....	2-4
2-3	Station Location for the 1993 Magnetic Survey.....	2-5
2-4	GPR Survey (1993).....	2-7
2-5	Sample Locations for the 1993 Soil Survey.....	2-8
3-1	Annual Wind Rose for H- Area.....	3-4
3-2	Comparison of Chronostratigraphic, Lithostratigraphic and Hydrostratigraphic Units.....	3-8
3-3	Hydrogeologic Nomenclature for the SRS Region.....	3-12
4-1	Map Showing the Location and Concentration of Metals Which Exceed the Unit-Specific Background Level.....	4-2

LIST OF TABLES

Number	Title	Page
1-1	Soil Sampling Intervals and Constituents Analyzed.....	1-14
1-2	Gunsite 720 Rubble Pit Soil Sample Data Summary.....	1-15
1-3	Laboratory Quality Control Results.....	1-16
1-4	Comparison of Maximum Soil Concentrations with Background Levels for Gunsite 720 Rubble Pit Unit.....	1-19
2-1	1993 Soil Sample Results: UST Area	2-10
2-2	1993 Soil Sample Results: Drum Area.....	2-11
2-3	Comparison of Maximum Soil Concentrations with Unit-Specific and SRS Background Levels and EPA Region III RBCs. 1990 and 1993 Data	2-13
4-1	Comparison of Maximum Soil Concentrations with Background Levels for Gunsite 720 Rubble Pit Unit.....	4-3

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
BRA	Baseline Risk Assessment
BTEX	benzene, toluene, ethylbenzene, xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEC	Cation Exchange Capacity
CLP	Contract Laboratory Program
COPCs	Chemicals of Potential Concern
CRQL	Contract Required Quantitation Limit
DOE	Department of Energy
EIS	Environmental Impact Statement
EM	Electromagnetics
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GPR	Ground Penetrating Radar
NEPA	National Environmental Policy Act
NPL	National Priority List
NWS	National Weather Service
OVA	Organic Vapor Analyzer
PIP	Public Involvement Plan
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
SWMU	Solid Waste Management Unit

TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively Identified Compounds
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WSRC	Westinghouse Savannah River Company

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EXECUTIVE SUMMARY

Gunsite 720 Rubble Pit Unit is located on the west side of SRS. This RCRA/CERCLA unit is approximately 304.9 meters (1000 feet) west of South Carolina Highway 125, 167.7 meters (550 feet) north of SRS Road A-2 and 2.4 kilometers (1.5 miles) from the nearest site boundary. The unit, which consists of an open area covered with natural shrub growth and surrounded by native pine trees and shrubs, encompasses an area of approximately 2,250 square meters (25,000 square feet). Two concrete slabs are located on the east side of the open area.

In the early to mid 1980s, while work was being performed in the area, nine empty, partially buried drums, labeled "du Pont Freon 11", were found. As a result, Gunsite 720 became one of the original waste units specified in the SRS RCRA Facility Assessment (RFA). The drums were excavated on July 30, 1987 and placed on a pallet at the unit. Both the drums and pallet were removed and disposed of in October 1989. The area around the drums was screened during the excavation and the liquid (rainwater) that collected in the excavated drums was sampled prior to disposal. No evidence of hazardous materials was found.

There is no documentation or record of any hazardous substance management, disposal, or any other type of waste disposal at this unit. There is no evidence of any burning, excavation or recent disposal activities having occurred in this area or that disposal activities were more widespread. Facility documents indicate that an underground fuel tank was located in the area; however, magnetic surveys, ground penetrating radar (GPR), and trenching failed to detect any storage tanks.

Unit Screening data indicate that hazardous substance concentrations appear to be "at or below background" although statistical background concentrations have not been calculated. The only hazardous substances exceeding their respective unit-specific background concentrations are acetone (laboratory artifact), bis(2-ethylhexyl) phthalate (laboratory artifact), barium, chromium, lead, and total mercury.

For the four hazardous substance metals which exceeded unit-specific background levels (barium, chromium, lead, and total mercury), a comparison with SRS and southeastern U. S. mean background values was made. Lead and chromium maximum field concentrations are less than both the maximum SRS background level and southeastern U. S. mean background levels. The maximum field value for barium is significantly less than mean southeastern U. S. background level. The maximum field value for total mercury is less than the SRS mean background level.

Based on comparison with unit-specific, SRS, and southeastern U. S. background concentrations, it appears that there has been no environmental impact due to hazardous substance disposal at the Gunsite 720 Rubble Pit Unit. There is also no evidence of any hazardous substance release from this unit.

Trenching operations at the unit uncovered common household garbage and a small amount of construction debris, but no buried tanks. Analytical results of soil samples taken from the trenches and debris identified in the trenches suggest that hazardous waste handling activity at the unit is unlikely.

A magnetic survey was conducted in 1986 to locate underground storage tanks (UST) believed to be buried on the unit. Three distinct anomalies were noted near the concrete pads, but the results of the survey were essentially inconclusive. Because of this and concerns regarding the existence of the UST and potential releases from those tanks, it was decided to run additional magnetic and ground penetrating radar (GPR) surveys and obtain additional soil samples from the area of concern. These samples would be analyzed for VOCs, TPH, benzene, toluene, ethylbenzene, xylene (BTEX) and metals.

Trenching, GPR, and magnetic surveys of Gunsite 720 found no evidence of burial pits or a UST. The soil sampling results indicate there are no substances at Gunsite 720 that trigger any regulatory action levels. In most cases, the substances detected are below unit-specific background levels. The results of the investigation indicate that no hazardous substances have been managed or are present at Gunsite 720.

Data collected during Preliminary Unit Evaluation, Unit Screening, and field investigations found no evidence of contamination at Gunsite 720 Rubble Pit Unit. Magnetic and GPR

surveys showed no signs of any buried hazardous materials including the UST that was previously located at the unit. An analysis of soil samples collected in 1990 and 1993 show that all materials detected in the soil are at or below background levels. No chemicals of concern were identified as a result of the investigations at this unit.

A review of the unit sampling plan and the resulting soil and soil vapor analytical data for the Gunsite 720 indicate the data are sufficient for use in an unit risk assessment evaluation. This evaluation was conducted to estimate the health or environmental problems that could result from the no further action alternative. The results indicate that the concentrations of all hazardous materials analyzed were near or below naturally occurring background levels and/or below any risk-based concentration action levels. Therefore, they pose no risk to human health and the environment.

Based upon screening available evidence, there are no potential chemicals of concern available for evaluation by a CERCLA baseline risk assessment and, therefore, there is no determinable risk associated with Gunsite 720.

An analysis of data collected as a result of the studies performed at Gunsite 720 Rubble Pit Unit indicates there is no contamination at that unit that will endanger human health or the environment. Survey data indicate that the substances found in the soils at the unit are within the levels normally associated with SRS background levels. In addition, it is also reasonable to conclude that, since there is no contamination, the unit presents no significant ecological risk.

Based on the review of the analytical data and screening techniques used to evaluate all the chemicals of potential concern at Gunsite 720 Rubble Pit Unit, it is recommended that no further remedial action be performed at this unit.

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1.0 INTRODUCTION

1.1 Purpose

This report summarizes the activities and documents the results of a Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) conducted at Gunsite 720 Rubble Pit Unit on the Savannah River Site (SRS) near Aiken, South Carolina. The RFI/RI was conducted in stages, beginning with a preliminary unit evaluation in October 1988, followed by a screening phase, and culminating in a field assessment stage in 1993.

The primary objective of the Remedial Investigation/Feasibility Study (RI/FS) is "to gather data sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given site" (EPA, 1988). In order to accomplish this, it is necessary to define the nature and extent of the contamination, determine the fate and transport of the contaminants, complete a baseline risk assessment (BRA), and identify remedial action objectives. In the event that a FS is required, this information is then used to identify potential remedial action alternatives and potential applicable or relevant and appropriate requirements (ARARs). To achieve the goals of this RI, both historical data and data collected during the 1993 characterization were used.

This introductory section presents background information about the unit, outlines the regulatory requirements guiding the investigation, the unit's history, and previous investigations at the unit.

1.1.1 SRS RCRA 3004(u)/CERCLA Program Description

The United States Department of Energy (DOE) Savannah River Field Office manages waste materials regulated under the Resource Conservation and Recovery Act (RCRA). In particular, certain activities require RCRA operating or post closure permits. Savannah River Site (SRS) has received a RCRA permit from the South Carolina Department of Health and Environmental Control (SCDHEC). Part V of the permit mandates that SRS establish and implement a RCRA Facility Investigation (RFI) Program to fulfill

requirements of RCRA Section 3004(u). Section V.A.1 of the permit lists solid waste management units (SWMUs) that were identified by the United States Environmental Protection Agency (EPA) Region IV through the RCRA Facility Assessment (RFA) process and therefore subject to the RFI process.

On December 21, 1989, SRS was included on the National Priority List (NPL). A unit included on the NPL falls under the jurisdiction of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This inclusion created the need to integrate the established RFI Program with CERCLA RI requirements. In accordance with Section 120 of CERCLA, DOE has negotiated a Federal Facility Agreement (FFA) with EPA and SCDHEC to integrate remedial activities at SRS into one comprehensive strategy which fulfills these dual regulatory requirements

SWMUs listed in the RCRA permit and the FFA Appendix are required to be further investigated to determine their actual or potential impact on the environment. Those listed units are called RCRA/ CERCLA Remedial Investigation Units in this document. Gunsite 720 Rubble Pit Unit is one of the RCRA/CERCLA units mandated for further investigation.

In order to conduct the RI/FS, SRS developed the *RFI/RI Program Plan* (WSRC [Westinghouse Savannah River Company], 1993) (originally titled the *RFI Program Plan*) to provide guidance and delineate standard procedures. It also provides a reasonable and cost effective approach while allowing SRS flexibility in the investigation of each RCRA/CERCLA unit. The plan specifies generic methods and procedures to be used for each unit investigation. Because of continuing change in the status of facilities at SRS, the program plan is periodically reviewed and modified to keep it current.

The *RFI/RI Program Plan* (WSRC, 1993), in conjunction with *Guidance for Conducting Remedial Investigations and Feasibility Studies (FS) Under CERCLA, Interim Final* (EPA, 1988), were used as the primary sources of guidance for work plan preparation. These references are jointly referred to as RFI/RI guidance documents. The work plan for Gunsite 720 Rubble Pit Unit conformed to the requirements specified in the RFI/RI guidance documents.

Sections 113 and 117 of CERCLA lists the requirements for public participation in the restoration process. These requirements include the establishment of an Administrative Record File that documents the selection of cleanup alternatives and provides for public review and comment on those alternatives. The DOE document, *Public Involvement, A Plan for the Savannah River Site* (DOE, 1994), is designed to facilitate public involvement in the decision-making processes for permitting, closure, and selection of remedial alternatives. The Public Involvement Plan (PIP) addresses the requirements of CERCLA, RCRA, and the National Environmental Policy Act (NEPA).

Unit-specific documentation, such as work plans and RIs, are a part of the Administrative Record File and are available to the public. Information repositories have been established at the DOE Public Reading Room located at the Gregg-Graniteville Library of the University of South Carolina in Aiken, South Carolina and the Thomas Cooper Library located at the University of South Carolina in Columbia, South Carolina. A notice will be published in local newspapers when information is compiled regarding the investigation of Gunsite 720 Rubble Pit Unit. Additional repositories may be added and/or locations changed to better meet the needs of the public.

1.2 Site Background

1.2.1 Site Description

Gunsite 720 Rubble Pit Unit is located on the west side of SRS. Figure 1-1 shows the location of the Gunsite 720 Rubble Pit Unit in relation to major SRS facilities. This RCRA/CERCLA unit is approximately 304.9 meters (1000 feet) west of South Carolina Highway 125, 167.7 meters (550 feet) north of SRS Road A-2 and 2.4 kilometers (1.5 miles) from the nearest site boundary. SRS coordinates for the unit are N80000/E27350.

Gunsite 720 Rubble Pit Unit consists of an open area covered with natural shrub growth and surrounded by native pine trees and shrubs which encompasses approximately 2,250 square meters (25,000 square feet). Two concrete slabs are located on the east side of the open area. Surface drainage in the area is to Upper Three Runs Creek. There are also swamps located to the west and northwest of the unit.

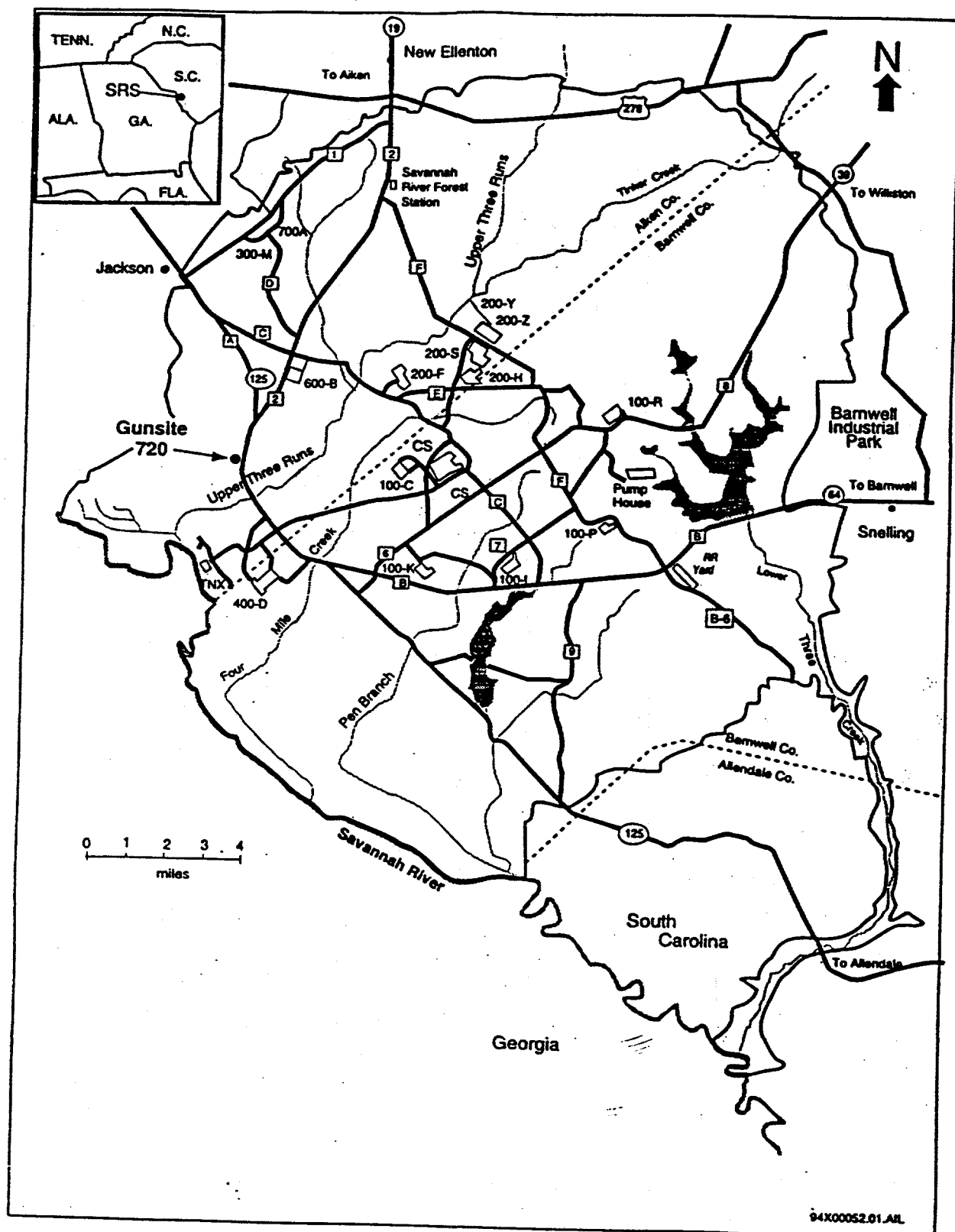


Figure 1-1 Location of Gunsite 720 in Relation to Major SRS Facilities

1.2.2 Site History

During the period from 1955 to 1960, the U. S. Army established anti-aircraft artillery gun emplacements onsite to defend SRS in the event of an air attack. A total of 19 gun emplacements with both 75 mm and 90 mm guns were set up. Gunsite 720 is one of those emplacements.

In the early to mid 1980s, while work was being performed in the area, nine empty, partially buried drums, labeled "du Pont Freon 11" were found at Gunsite 720. As a result, Gunsite 720 became one of the original waste units specified in the SRS RCRA Facility Assessment (RFA). When SRS was listed on the NPL, those waste units became RCRA/CERCLA waste units and were placed in Appendix C (RCRA/CERCLA units) of the FFA.

The drums were excavated on July 30, 1987 and placed on a pallet at the unit. The drums and pallet were removed and disposed of in October 1989. The area around the drums was screened during the excavation and the liquid (rainwater) that collected in the excavated drums was sampled prior to disposal. Information about the screening/sampling is vague, but it was reported that no evidence of hazardous materials was found.

Older SRS maps and plans indicate that an underground fuel storage tank (UST) was at the unit. An above ground tank was also noted on the maps. There is no physical evidence that the tanks currently exist at Gunsite 720. The unit presently consists of two concrete slabs and an abandoned well.

There is no documentation or record of any hazardous substance management, disposal, or any other type of waste disposal at this unit. There is no evidence of any burning, excavation or recent disposal activities having occurred in this area or that disposal activities were more widespread. Facility documents indicate that an underground fuel tank was located in the area; however, magnetic surveys, ground penetrating radar (GPR), and trenching failed to detect any storage tanks or buried debris.

1.3 Previous Investigations

The first step towards determining if a hazardous substance has been released from a RCRA/CERCLA unit consists of a Preliminary Unit Evaluation. The primary goal of the preliminary evaluation is to determine what hazardous substances, if any, were disposed of or released from the unit.

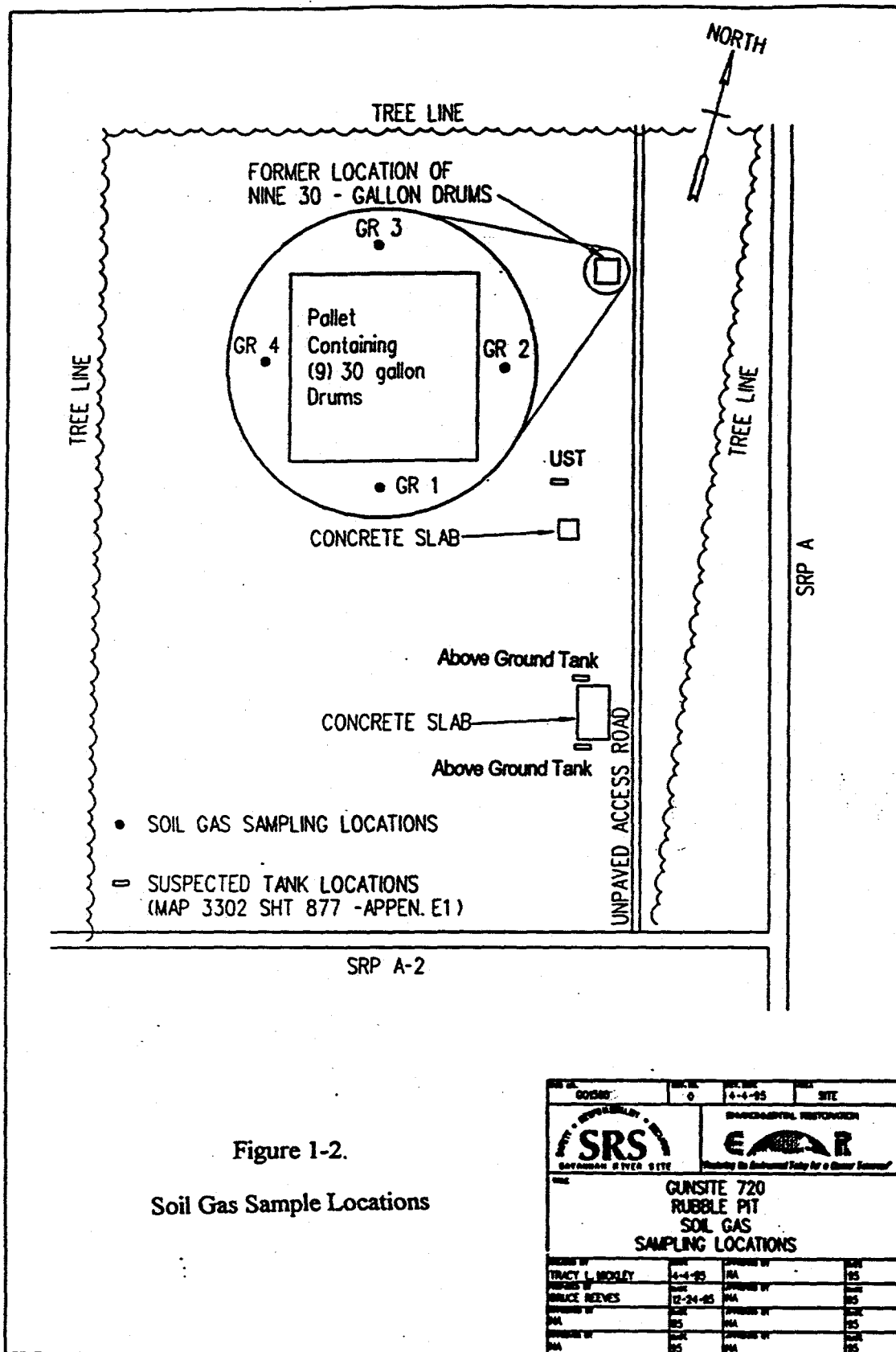
Previous sampling data for Gunsite 720 Rubble Pit Unit consists of four soil gas samples taken in March 1988 as part of a survey of selected potential waste sites at SRS (Looney et al, 1988). Those soil gas sampling locations are indicated in Figure 1-2. All four soil gas samples were taken from 0.5 m (1.5 feet) depths around the palletized drums. Analytical results of these samples found only trace levels of volatile organic compounds (VOCs). No analyses for light or fuel-related hydrocarbons were performed at this time.

Based on the preliminary evaluation results, a Unit Screening Plan for Gunsite 720 Rubble Pit Unit was formulated. The following sections describe the Preliminary Unit Evaluation and Unit Screening procedures and results. Chapter 2 describes the activities conducted to complete the Unit Assessment.

1.3.1 Preliminary Unit Evaluation

A review of existing literature and information from Gunsite 720 Rubble Pit Unit, conducted in accordance with the *RFI/RI Program Plan* (WSRC, 1993), included:

- Physical and chemical characteristics of the waste (hazardous and non-hazardous) known to be managed at the unit;
- Unit/disposal area characteristics;
- General hydrogeologic conditions of the unit and the current environmental setting;
- Any previous sampling and/or monitoring data for the unit.



1.3.1.1 Existing Literature and Information

Existing information specifically pertaining to the Gunsite 720 Rubble Pit Unit was reviewed. A complete list of the documents reviewed is included in Section 5.2.1 of the *RFI/RI Plan for the Gunsite 720 Rubble Pit, WSRC-RP-90-1049* (WSRC, 1990).

1.3.1.2 RFI/RI Literature Review Checklist

This checklist presents RFI data and information that are specific to each individual environmental medium. Copies of the completed checklist appear in Appendix D.1 of the *RFI/RI Plan for the Gunsite 720 Rubble Pit, WSRC-RP-90-1049* (WSRC, 1990).

1.3.1.3 RFI/RI Site Reconnaissance

Following a review of all existing data and information, a unit reconnaissance was performed to further assess the following field conditions:

- environmental setting;
- source characterization (RCRA/CERCLA unit conditions and waste characteristics);
- waste release potential (for each environmental medium).

The completed "Site Reconnaissance Field Data Sheet" lists unit-specific factors considered during the actual reconnaissance. This data sheet was completed in full to provide appropriate written documentation of field observations. Following the unit reconnaissance, the Literature Review Checklist was updated to include information and data collected from the field visit.

1.3.1.4 Preliminary Unit Evaluation Results

Information regarding current unit conditions is listed on the Literature Review Checklist and the Unit Reconnaissance Field Data Sheet which can be found in Appendix D.2 of the *RFI/RI Plan for the Gunsite 720 Rubble Pit, WSRC-RP-90-1049* (WSRC, 1990). That information is summarized in Sections 1.3.1.4.1 through 1.3.1.4.2.

1.3.1.4.1 Waste Characteristics

Little is known about any waste disposal activities at this unit. The unit was originally used by the military for air defense of the Savannah River reservation. Several anti-aircraft guns were located at the unit, hence the name "Gunsite". Additionally, barracks and other support facilities were located at or near the unit to house and support military personnel working at the Gunsite. Presently, Gunsite 720 Rubble Pit Unit is an inactive receptor of waste; however, no documentation describing past waste disposal activities at the unit is known to exist. No known hazardous waste disposal activities have occurred at the unit.

Nine empty 30-gallon drums were excavated and palletized on 31 July, 1987. The drums, located in an 2.5 meter by 2.5 meter (8 feet by 8 feet) area, were found partially exposed among piled refuse and some shrubs. Six of the drums had their tops cut out, their sides folded inward and were found bottom side up. The other three drums were found intact but not sealed. "du Pont Freon 11" was painted on the drums. A survey of the drums and two soil samples using a photoionization detector produced readings of less than 2 ppm. These drums were removed from the unit in October 1989.

A review of the 1952 SRS Map 3302 Sheet 877 indicated that an underground tank and one or more fuel tanks were located near each of the concrete slabs. In 1986, a magnetic survey was conducted to locate underground tank(s) believed to be buried at the unit. The results of the survey were inconclusive although high readings were recorded near one of the concrete pads. It was not known, however, whether these readings were caused by a buried tank, concrete reinforcement rods, or other construction debris buried near the pad.

1.3.1.4.2 Unit/Disposal Area Characteristics

The palletized drums and rubble pit area encompass approximately 2250 square meters (25,000 square feet). There is no evidence of excavation, but construction debris and soil appear to have been disposed of in a random manner throughout the unit. Ground penetrating radar, conducted in March 1989, revealed small objects scattered throughout

the unit. No underground tanks were identified during this survey, although large objects were detected near both concrete pads.

1.3.2 Unit Screening

A Unit Screening program was performed at Gunsite 720 Rubble Pit Unit because the Preliminary Unit Evaluation indicated a possible receipt of hazardous substances. The primary goal of the Unit Screening phase is to identify if a release of hazardous substances did occur and areas potentially impacted by a hazardous substance release. The *RFI/RI Program Plan* (WSRC, 1993) specifies that Unit Screening investigative activities include one or more of the following geophysical and/or geochemical techniques:

- Geophysical investigations such as ground penetrating radar (GPR) or electromagnetics (EM);
- Soil gas analysis; and/or
- Confirmation soils analysis.

The three options listed above were first evaluated regarding their applicability at Gunsite 720 Rubble Pit Unit and a program was then designed and implemented.

1.3.2.1 Evaluation of Unit Screening Options

A geophysical investigation using ground penetrating radar (GPR) was selected because the unit consists of several mounds of dirt and appears to have been used as a surface disposal area for construction rubble and/or spoil dirt. This technology would allow for a search of buried drums, other containers, and subsurface features.

Soil gas data (Looney et al, 1988) collected during a survey of selected potential waste sites at SRS (see Section 1.3) show trace levels of volatile organic compounds (VOCs) that suggests the possible past disposal of chlorinated solvents at this unit. Because of this, confirmation soil analysis was selected to screen for semi-volatile and volatile organic compounds, metals and radioactivity.

1.3.2.2 Unit Screening Geophysical Survey

A ground penetrating radar (GPR) survey was conducted by Site personnel in March 1989. Reports based on that survey indicate that there is no evidence of buried or underground objects in the area. Additional documentation on that survey is not available.

1.3.2.3 Unit Screening/Confirmation Soil Analysis Sampling

The goal of the unit screening effort was to evaluate whether a hazardous substance release had occurred and to identify any chemical constituents involved. Chemical parameters which indicate the presence and magnitude of a hazardous waste or hazardous substance release were selected for analysis. For screening at Gunsite 720 Rubble Pit Unit, the following chemical parameters were analyzed at selected locations:

- Full EPA Appendix IX (40 CFR, Part 264) scan;
- Radionuclide indicators (gross alpha, gross beta);
- Total metals (eight RCRA metals: As, Ba, Cd, Cr, Pb, Hg, Se, Ag);
- Volatile organics (EPA Method 8240);
- Semi-Volatile Organics (EPA Method 8270); and
- Physical parameters (soil pH, TOC);
- Total petroleum hydrocarbons.

Chemical parameters were selected to obtain information on waste disposal history (waste oils, volatile organics, semi-volatile organics, and metals), waste characterization (Appendix IX, radionuclide indicators), constituents in excess of background, or to provide sufficient information to indicate constituent absence (Appendix IX, radionuclide indicators).

1.3.2.3.1 Soil Sampling

Soil samples were collected in 1990 by two different methods at Gunsite 720 Rubble Pit Unit. A stainless steel hand auger was used to obtain soil samples from seven boreholes within the unit as well as one background soil sample outside the unit. Subsurface soil samples were taken from depths of 0-0.9 meters (0-3 foot) and 1.8-2.4 meters (6-8 feet)

below the ground surface. Two additional soil grab samples were taken from Trench 01 at a depth of 1.8-2.4 meters (6-8 feet). Borehole and trench sample locations are shown on Figure 1-3.

Soil samples were analyzed at the intervals and for the constituents indicated in Table 1-1. Sample identification nomenclature and quality control field samples are also indicated in this table.

1.3.2.3.2 Soil Analytical Results

All substances detected at concentrations greater than analytical method detection limits have been summarized and are reported in Table 1-2. The constituent concentrations listed are those which the contract laboratory has reported "above detection limits". Reporting of these values does not imply that these levels are above background because statistical background levels have not been quantified. Similarly, reported levels are not "remediation trigger levels" or "clean-up levels".

Three organics species, acetone, bis(2-ethylhexyl) phthalate, and methylene chloride, were detected in soil samples collected from the target areas. Concentrations ranged from 12-24 $\mu\text{g/kg}$ (acetone), 39-660 $\mu\text{g/kg}$ bis (2-ethylhexyl) phthalate, and 8-14 $\mu\text{g/kg}$ (methylene chloride). Acetone, bis(2-ethylhexyl) phthalate and methylene chloride are documented laboratory artifacts. The concentration of acetone and methylene chloride found in laboratory blanks ranged from < 13 to 16 $\mu\text{g/kg}$ and < 8 to 11 $\mu\text{g/kg}$ respectively (Table 1-3). The concentrations of these common laboratory contaminants, in their respective samples, do not exceed 10 times the maximum concentration of like compounds detected in any blank. Consequently, the concentrations of acetone, and methylene chloride detected in unit samples are not considered to be positive detections.

The Practical Quantitation Limit (PQL) for bis(2-ethylhexyl) phthalate is 660 $\mu\text{g/kg}$ for soils and sediments. The PQL is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Since the highest concentration of bis(2-ethylhexyl) phthalate detected in any sample is 660 $\mu\text{g/kg}$, or the PQL, and bis(2-ethylhexyl) phthalate is known laboratory artifact, the significance of its detection in unit samples is believed to be minimal.

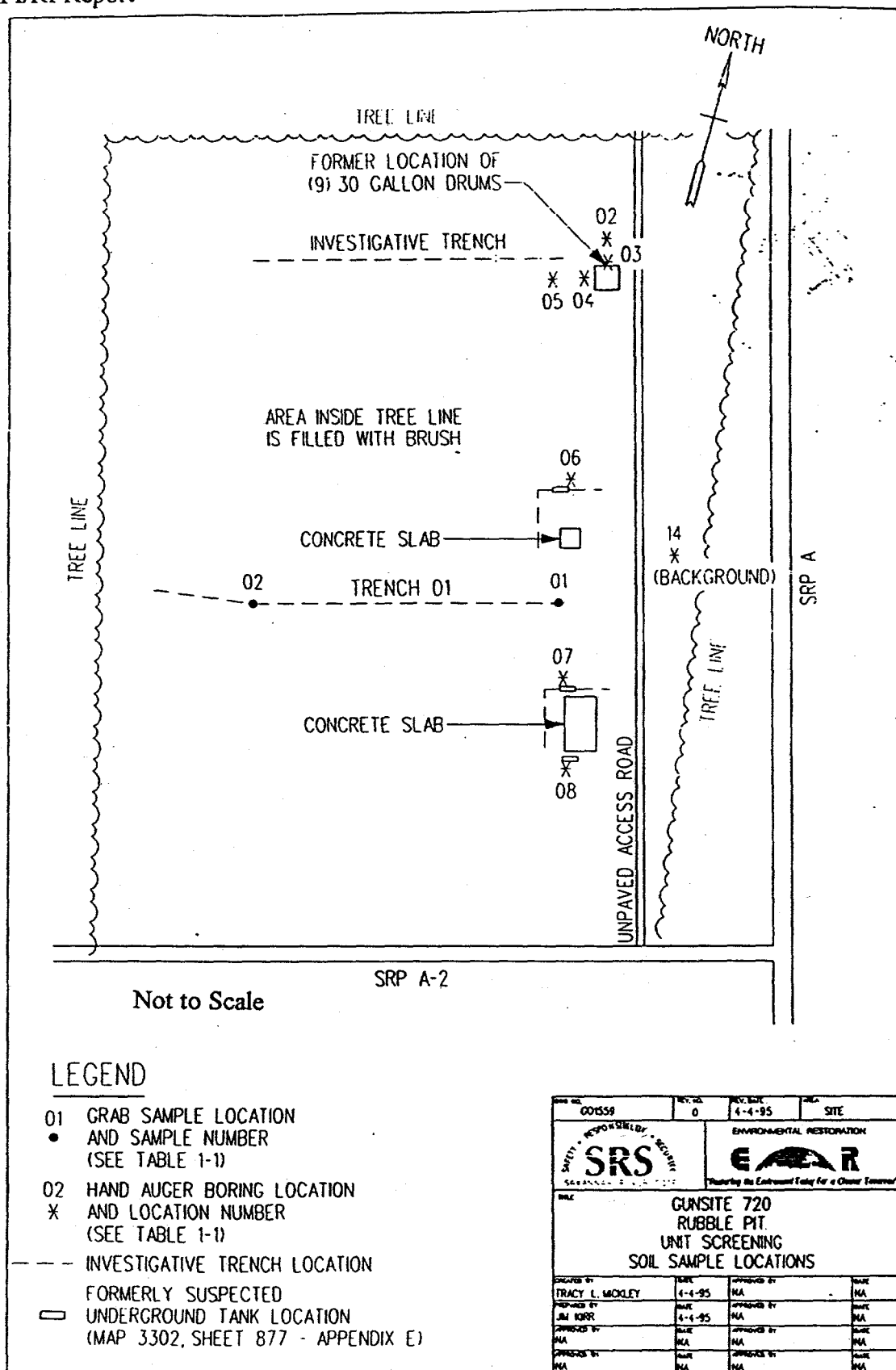


Figure 1-3 Unit Screening Soil Sample Locations

TABLE 1-1
Soil Sampling Intervals and Constituents Analyzed (1990)

GS720 Location	Location Number	Sample Number	Sampling Method	Sample Depth meters (feet)	Required Analyses
Trench	01	01	Grab	1.8-2.4 (6-8)	1,2,4,5,7
	01	02	Grab	1.8-2.4 (6-8)	1,3,4,5
Borehole	02	01	Hand Auger	0-0.9 (0-3)	1,4,5
	02	01A	Duplicate	0-0.9 (0-3)	1,5
Borehole	03	01	Hand Auger	0-0.9 (0-3)	1,2,4
Borehole	04	01	Hand Auger	0-0.9 (0-3)	1,4,7
Borehole	05	01	Hand Auger	0-0.9 (0-3)	1,5
	05	01D	Split Sample	0-0.9 (0-3)	1,5
Borehole	06	01	Hand Auger	1.8-2.4 (6-8)	1,5,6
Borehole	07	01	Hand Auger	1.8-2.4 (6-8)	1,5,6
Borehole	08	01	Hand Auger	1.8-2.4 (6-8)	1,5,6
GS 720	10	01E	Auger Rinsate	N/A	1,4
GS 720	11	01E	Backhoe Rinsate	N/A	1
GS 720	12	01B	Trip Blank	N/A	1
Background	14	01	Hand Auger	0-0.9 (0-3)	1,2,4,5,7

Analyses are coded as follows:

1. Volatile Organics
2. Radionuclide indicators (gross alpha and gross beta using a gas proportional counter)
3. Appendix IX Compounds
4. Total metals (eight RCRA metals: As, Ba, Cd, Cr, Pb, Hg, Se, Ag)
5. Semi-Volatile Organics
6. Total Petroleum Hydrocarbons (TPH)
7. Indicator Parameters: pH, specific conductance, Total Organic Carbon (TOC)

Note: Headspace Screening for volatile organics was performed on all samples in the field using an OVA.

Table 1-2
Gunsite 720 Rubble Pit Soil Sample Data Summary

GS720 Sample Location	Depth meters (feet)	Acetone	Bis(2- ethylhexyl) Phthalate	Methylene Chloride	1,2- Dichloro ethylene	Tetrachloro- ethylene	Trichloro- ethylene	T P H	TOC (mg/kg)	Barium (mg/kg)	Chromium (mg/kg)	Total Mercury (mg/kg)	Lead (mg/kg)	Gross Alpha (pCi/g)	Gross Beta (pCi/g)	pH (standard units)
01-01	1.8-2.4 (6-8)	24 B	<360	10 B	<6	<6	<6	NA	3180	53.9	4	<0.11	4.4	18	4	5
01-02	1.8-2.4 (6-8)	24 B	39 J	9 B	<5	<5	<5	NA	NA	<31.8	6.1	0.12	3.9	NA	NA	NA
02-01	0-0.9 (0-3)	13 B	300 J	11 B	<5	<5	<5	NA	NA	<38	2.7	<0.1	2.8	NA	NA	NA
02-01A	0-0.9 (0-3)	14 B	660	8 B	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
03-01	0-0.9 (0-3)	13 B	NA	8 B	<5	<5	<5	NA	NA	<41.8	2.9	<0.11	2.2	20	4	NA
04-01	0-0.9 (0-3)	12 B	NA	9 B	<5	<5	<5	NA	2700	<37	3	<0.11	6.8	NA	NA	5.2
05-01	0-0.9 (0-3)	12 B	330 J	8 B	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
05-01D	0-0.9 (0-3)	<10	170	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
06-01	1.8-2.4 (6-8)	17 B	190 J	8 B	<6	<6	<6	<4.4	NA	NA	NA	NA	NA	NA	NA	NA
07-01	1.8-2.4 (6-8)	12 JB	67 J	14 B	<6	<6	<6	12	NA	NA	NA	NA	NA	NA	NA	NA
08-01	1.8-2.4 (6-8)	16 B	53 J	10 B	<6	<6	<6	<4.6	NA	NA	NA	NA	NA	NA	NA	NA
10-01E	Auger Rinse	<10	NA	3 JB	20	5	6	NA	NA	<200	<10	<0.2	<3	NA	NA	NA
11-01E	Backhoe Rinse	4 J	NA	4 JB	8	2 J	2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
12-01B	Trip Blank	<10	NA	6 B	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Background																
14-01	0-0.9 (0-3)	12 B	410	11 B	<5	<5	<5	NA	274	<32.1	3	<0.11	2.6	23	4	4.9
Units: ug/kg unless specified otherwise																
B - Analyte was found in laboratory blank.																
J - Estimated value. Mass spectral data indicate the presence of the compound meeting the identification criteria, but the concentration is less than the specified limit and greater than zero.																
NA - Not Analyzed																
TOC - Total Organic Carbon																
TPH - Total Petroleum Hydrocarbons																

TABLE 1-3
LABORATORY QUALITY CONTROL RESULTS

A. Laboratory Method Blanks (for all values exceeding method detection limits)

<u>Constituent</u>	Lab Blank	Field Sampling
	Concentration	Concentration
	<u>Range (µg/kg)</u>	<u>Range (µg/kg)</u>
acetone	< 13 to 16*	12 to 24
methylene chloride	< 8 to 11**	8 to 14

* The Contract Required Quantitation Limit (CRQL) for acetone is 10 µg/kg. CLP protocol allows blank concentrations of up to 5 times the CRQL for this constituent. If the blank contains detectable levels of acetone, then a sample result should be considered a "positive" result only if the acetone concentration in the sample exceeds 10 times the maximum amount detected in any blank.

** The CRQL for methylene chloride is 5 µg/kg. Contract Laboratory Program (CLP) protocol allows blank concentrations of up to 5 times the CRQL for this constituent. If the blank contains detectable levels of methylene chloride, then a sample result should be considered a "positive" result only if the methylene chloride concentration in the sample exceed 10 times the maximum amount detected in any blank.

The CRQL is a chemical specific level that a CLP laboratory must be able to routinely and reliably detect and quantitate in specific matrices. The CRQL may or may not be equal to the reported quantitation limit of a given chemical in a given sample trace levels of gross alpha and gross beta detected in the unit samples were no greater than unit background. Low concentrations of barium, chromium, total mercury, and lead were also detected, but these concentrations are less than SRS and Southeastern U. S. background soil concentrations. These results as well as total organic carbon (TOC) and pH are also included in Table 1-2.

Results of the Appendix IX analysis indicate that no herbicides, pesticides, PCBs, dioxins/furans, or other organic substances were detected. No chlorinated solvents other than trace levels of methylene chloride were detected in any sample.

1.3.2.3.3 Trenching Observations

Four trenches (see Figure 1-3) were excavated at the unit for the purpose of visually characterizing buried waste and to positively locate and identify buried tanks, if any, at the unit. A backhoe was used to dig all trenches to an approximate depth of 2.4 meters (8 feet) and a width of 1 meter (3.3 feet). The local water table was encountered at a depth of about 2.1 meters (6.9 feet) in all trenches. All trenches were backfilled with the excavated materials and leveled after all observations had been made.

Trench 01 was approximately 61 meters (200 feet) long and transected the unit where the majority of debris was believed to be buried (Figure 1-3). The purpose of this trench was to characterize any debris found buried at the unit. Only localized areas of household garbage, including cans, bottles, bottlecaps, wire, hose, and a tire, were found in the trench. Two soil composite grab samples were taken from depths between 1.8 - 2.4 meters (6-8 feet). Analysis of these samples is discussed in Section 1.3.2.3.1.

An additional investigative trench, approximately 55 meters (180 feet) long, transects the unit north of Trench 01 (Figure 1-3). The purpose of this trench was to characterize the debris buried at the unit and to visually compare with Trench 01 for vertical and horizontal consistencies. Like Trench 01, only localized areas of household refuse were found. The lithology of the investigative trench was identical to that of Trench 01. Consequently, the test pit report for Trench 01 was used to describe the investigative trench lithology. The investigative trench was identified as Trench "02" on the test pit report. No soil samples were taken from this trench.

The purpose of the trench excavated around the large concrete slab in the southeastern part of the unit was to confirm or deny the existence of two fuel storage tanks (Figure 1-3). No tanks were found; however, wires, two buried pipes, and a possible sewerline originating from the concrete slab were uncovered. Two composite soil samples were

taken from a depth of 1.8-2.4 meters (6-8 feet) using a hand auger. Analytical results from those samples are provided in Table 1-2.

The trench excavated around the small concrete slab (Figure 1-3) was to locate an underground storage tank listed on Savannah River Plant Topographic Map 3302, Sheet 877. Although a large concrete foundation was discovered, no buried tank was found. One composite soil sample was taken from a depth of 1.8-2.4 meters (6-8 feet) using a hand auger. Analytical results for this sample are provided in Table 1-2.

All the trenches were lithologically characterized by a field geologist. Geologic characterization results are discussed in detail in the *RFI/RI Plan for the Gunsite 720 Rubble Pit, WSRC-RP-90-1049* (WSRC, 1990).

1.3.2.4 Unit Screening Conclusions

Based on the Unit Screening data, hazardous substance concentrations appear to be "at or below background" although statistical background concentrations have not been calculated. A comparison of field data with unit-specific background data is shown in Table 1-4. The only hazardous substances exceeding their respective unit-specific background concentrations are acetone (laboratory artifact), bis(2-ethylhexyl) phthalate (laboratory artifact), barium, chromium, lead, and total mercury.

For the four hazardous substance metals which exceeded unit-specific background levels (barium, chromium, lead, and total mercury), a comparison with SRS and southeastern U. S. mean background values was made (Table 1-4). Lead and chromium maximum field concentrations are less than both the maximum SRS background level and southeastern U. S. mean background levels. The maximum field value for barium is significantly less than mean southeastern U. S. background level. The maximum field value for total mercury is less than the SRS mean background level. When compared to two times background levels, lead and chromium exceed the levels but only by a small margin (Table 1-4). Based on comparison with unit-specific, SRS, and southeastern U. S. background concentrations, it appears that there has been no environmental impact due to hazardous substance disposal at the Gunsite 720 Rubble Pit Unit. There is also no evidence of any hazardous substance release from this unit.

TABLE 1-4
COMPARISON OF MAXIMUM SOIL CONCENTRATIONS
WITH BACKGROUND LEVELS FOR
GUNSITE 720 RUBBLE PIT UNIT

Hazardous Substance*(units)	Maximum Soil Concentration - Unit Screening	Unit-Specific Background Level	Two times Unit-Specific Background Level	SRS Media Background Level**	Southeastern U.S. Level** *
Acetone (µg/kg)	24B	17B	34	—	—
Bis(2-ethylhexyl) phthalate (µg/kg)	660	410	820	—	—
Methylene Chloride (µg/kg)	14B	11B	22	—	—
Total Petroleum Hydrocarbons (µg/kg)	12	NA	NA	—	—
Gross alpha (pCi/g)	20	23	46	—	—
Gross beta (pCi/g)	4	4	8	—	—
Barium (mg/kg)	53.9	< 32.1	< 64.2	50.4-65.13	225
Chromium (mg/kg)	16.32	3	6	1.31-105.1	—
Total mercury (mg/kg)	0.12	< 0.11	< 0.22	< 0.01-0.1	0.1
Lead (mg/kg)	6.8	2.6	5.2	< 1.0-16.67	13

* For substances detected in excess of method detection limit

** data from Looney et, 1990

*** For substances which exceeded the unit-specific background area results; data from Conner and Shacklette, 1975

B Analyte was found in Laboratory Blank.

NA Not Analyzed

Trenching operations at the unit uncovered common household garbage and little construction debris, but no buried tanks. Analytical results of soil samples taken from the trenches and debris identified in the trenches suggest that hazardous waste handling activity at the unit is unlikely as is the existence of buried tanks. No other buried materials were located by the GPR, magnetic or soil gas surveys.

1.4 Report Organization

This RFI/RI Report, following EPA Guidance (EPA, 1988), consists of seven chapters for describing the rationale for the investigation, unit characterization activities conducted, data evaluation, risk assessment, and data assessment. Chapter 1 provides background information summarizing the history of the unit, and the purpose and objectives of this investigation. Chapter 2 describes the objectives of the EPA-approved work plan. Chapter 3 describes the physical characteristics of the unit including surface topography, hydrogeology, soil types, demography and land use, and ecology. Chapter 4 presents an evaluation of the contamination present at Gunsite 720 Rubble Pit Unit. Chapter 5 evaluates the fate and transport mechanisms applicable to the contaminants detected, and Chapter 6 presents a summary of the human health and ecological baseline risk assessment. Chapter 7 summarizes the results of the RCRA/CERCLA Unit Assessment along with conclusions derived from data analysis.

2.0 STUDY AREA INVESTIGATION

2.1 Surface Feature Investigation

The general topography of Gunsite 720 Rubble Pit Unit has been mapped and the surface drainage delineated. Figure 2-1 is a topographic map of the unit and Chapter 3.0 provides additional information on area physiography.

2.2 Contaminant Source Investigation

The general history of this area does not provide any information about its use as a waste unit. However, a unit screening program was required since the preliminary unit evaluation indicated the possible disposal of hazardous substances. The unit screening is discussed in Section 1.3.2.

2.3 Meteorological Investigation

As a nuclear facility, SRS maintains a system of seven meteorological towers located adjacent to each production area and at the WJBG-TV tower about 15 kilometers (9 miles) north of the unit. In addition, the National Weather Service (NWS) maintains a station at Augusta's Bush Field airport approximately 26 kilometers (16 miles) northwest of this area.

Data from these sources have been compiled and published in numerous documents including the environmental impact statement (EIS) for continued operation of K-, L-, and P- Reactors (DOE, 1990), and the Draft EIS for the Siting, Construction, and Operation of New Production Reactor Capacity (DOE, 1991). Meteorological data are summarized in Section 3.2. No ambient air sampling was performed because Gunsite 720 Rubble Pit Unit is inactive with no potential for impact to the air.

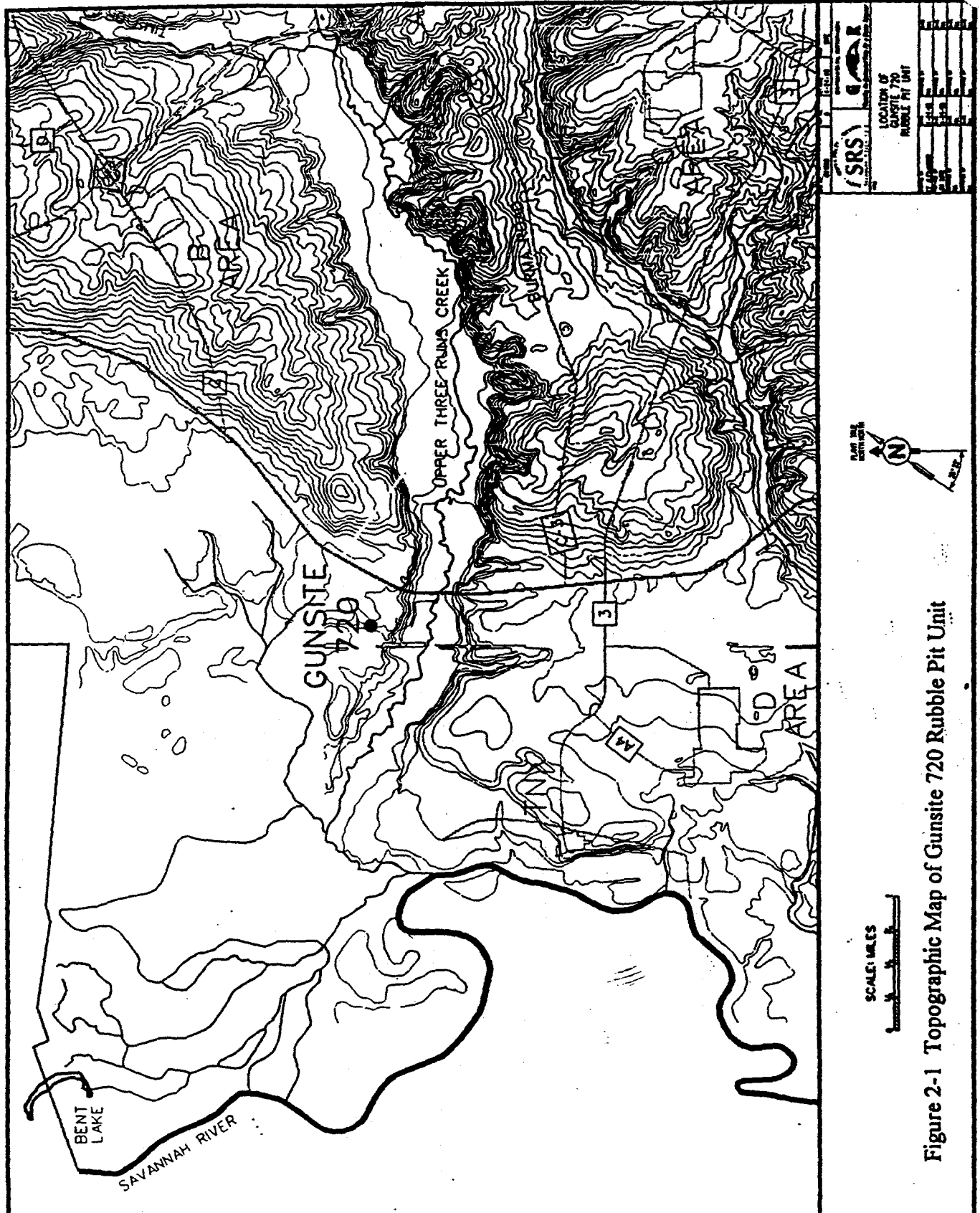


Figure 2-1 Topographic Map of Gunsite 720 Rubble Pit Unit

2.4 Surface Water and Sediment Investigation

Surface water/sediment sampling was not conducted because the nearest surface water is Upper Three Runs Creek located about 1.3 kilometers (0.8 miles) southeast of the unit.

2.5 Soil/Vadose Zone Investigations

As noted in Section 1.3.1.4.1, a magnetic survey was conducted in 1986 to locate underground storage tanks (UST) believed to be buried on the unit. The location of that survey is shown in Figure 2-2. Three distinct anomalies were noted near the concrete pads, but the results of the survey were essentially inconclusive. Because of this and concerns regarding the existence of the UST and potential releases from those tanks, it was decided to run additional magnetic and ground penetrating radar (GPR) surveys and obtain additional soil samples from the area of concern. These samples would be analyzed for VOCs, TPH, benzene, toluene, ethylbenzene, xylene (BTEX) and metals.

2.5.1 Magnetic Survey

A magnetic survey of Gunsite 720 was conducted in 1993 by the Environmental Monitoring Section Groundwater Group. Figure 2-3 shows the location of that survey. Data were collected with an EG&G Geometrics G-856 Gradiometer.

The most prominent feature noted in this survey was an anomaly in the vicinity of the small concrete pad. This anomaly has the same shape as that noted in the 1986 survey except that the anomaly appears to be rotated 90 degrees. The 1993 anomaly is what would be expected from a flat slab at this latitude. The difference in orientation between the 1986 and 1993 reading has no reasonable explanation. However, the shape and magnitude of the anomaly is consistent with an anomaly produced by a concrete slab reinforced with steel bars.

An anomaly noticed on the surface in the 1986 survey was interpreted as being caused by a truck parked on the highway. A metal cable anchor is also located in that area and is the most probable cause of that anomaly. The third anomaly detected in 1986 was not noted

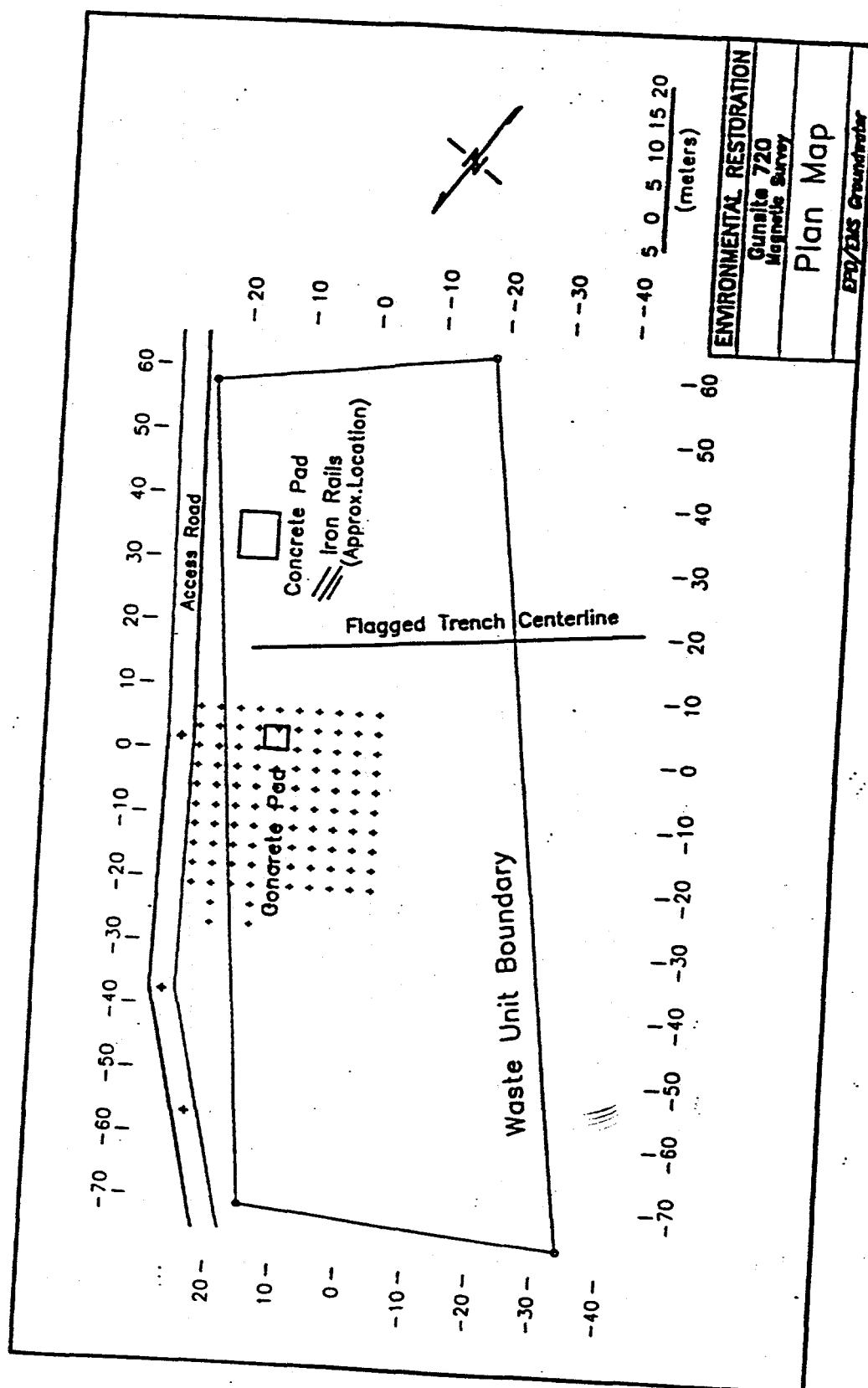


Figure 2-2. Station Locations for the 1986 Magnetic Survey

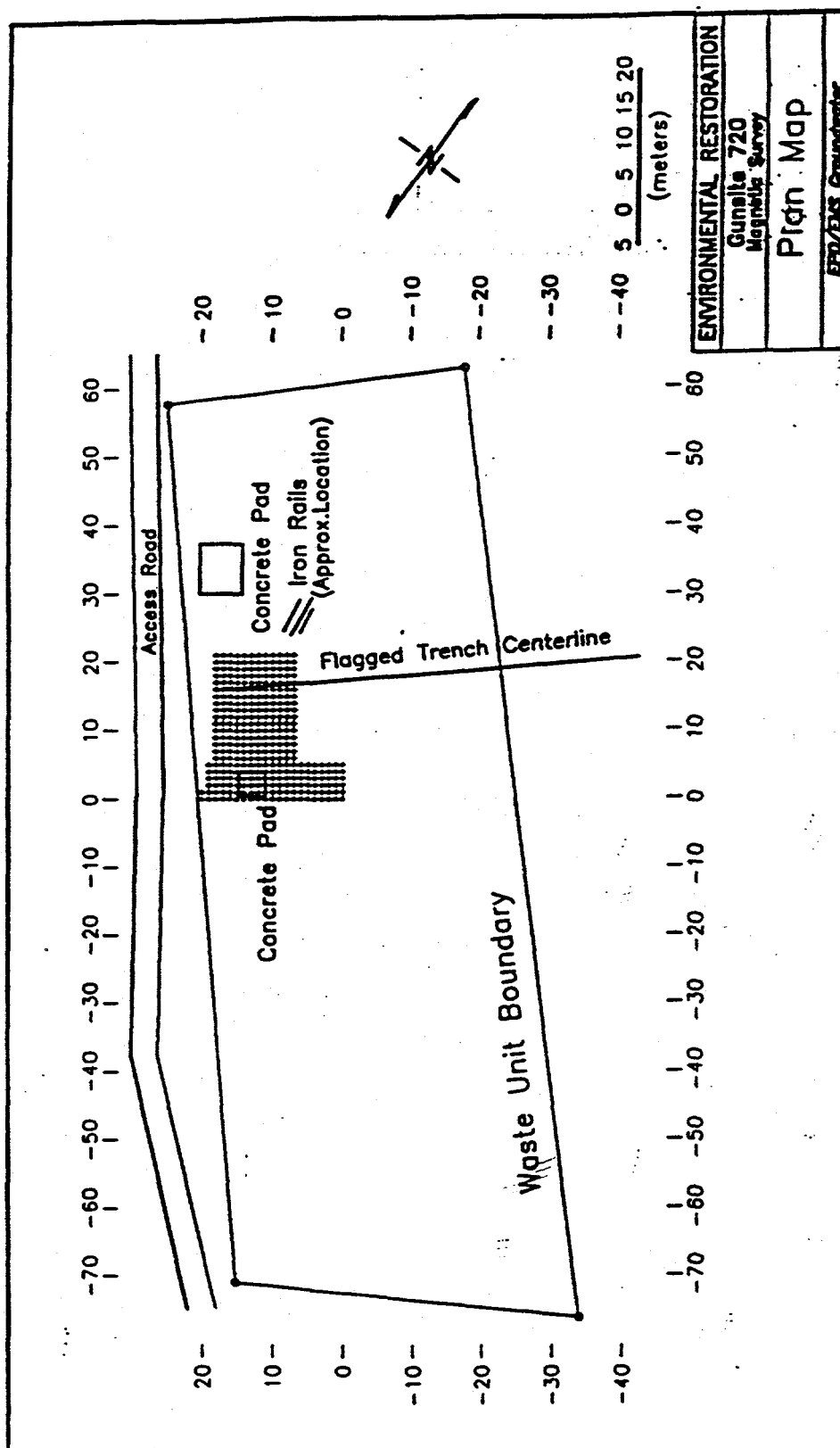


Figure 2-3. Station Locations for the 1993 Magnetic Survey

in this recent survey. This is apparently caused by the excavation and removal from this location of a large concrete object with metal pipes in the time interval between the two surveys.

The 1993 survey has produced a much better resolution of the magnetic anomaly associated with the pad. That anomaly is produced only by the pad. The possible presence of a buried metal tank around the pad is unsupported based on the magnetic data. All other anomalies identified in the 1986 and 1993 surveys can be attributed to metal objects that were either excavated between the two surveys, or that can be identified on the ground surface. Specific data for the magnetic survey are provided in Appendix A.2.

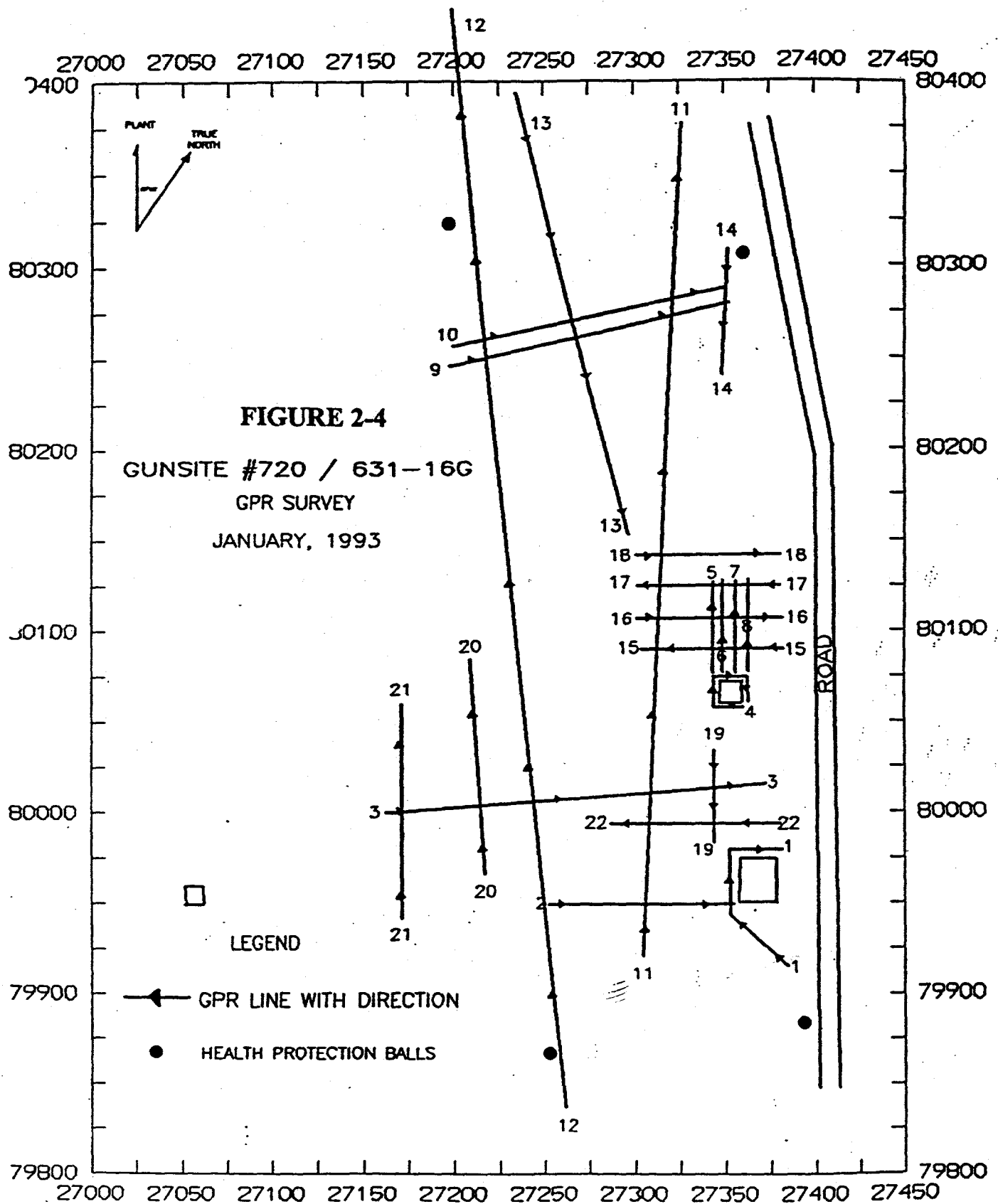
2.5.2 Ground Penetrating Radar Survey

Ground Penetrating Radar (GPR) surveys were run at Gunsite 720 in January and March 1993 for the purpose of locating trenched areas, pipelines and subsurface targets of interest. GPR data were acquired on 22 lines totaling 3437 feet. Figure 2-4 is a map of the location of the lines that were investigated during this survey.

Data collected at Gunsite 720 was of good quality. Lines 1 - 22 (see Figure 2-4) contain prominent diffractions possibly indicating pipes or buried metallic objects along the GPR transect. Areas within the red ball markers are distinguished by chaotic returns indicating disturbed soils where trenching or back-filling has occurred. A high amplitude event occurring almost continuously on each line may indicate the water table. Copies of the GPR records for each line are provided in Appendix A.1.

2.5.3 Soil Sampling

Additional soils samples were collected from the areas where the drums had been found and the UST was believed to be located to make a final determination if there has been any release of hazardous substances into the environment. Figure 2-5 shows the location of the samples collected in the 1993 survey. Samples were collected from 1.2 - 1.8 meters (4 - 6 feet), 2.4 - 3.1 meters (8 - 10 feet), 3.1 - 3.7 meters (10 - 12 feet), 3.7 - 4.3 meters (12 - 14) feet at both sites. Additional samples from 4.3 - 4.9 meters (14 - 16 feet) and 4.9 - 5.5 meters (16 - 18 feet) were collected in the vicinity of the UST. All samples



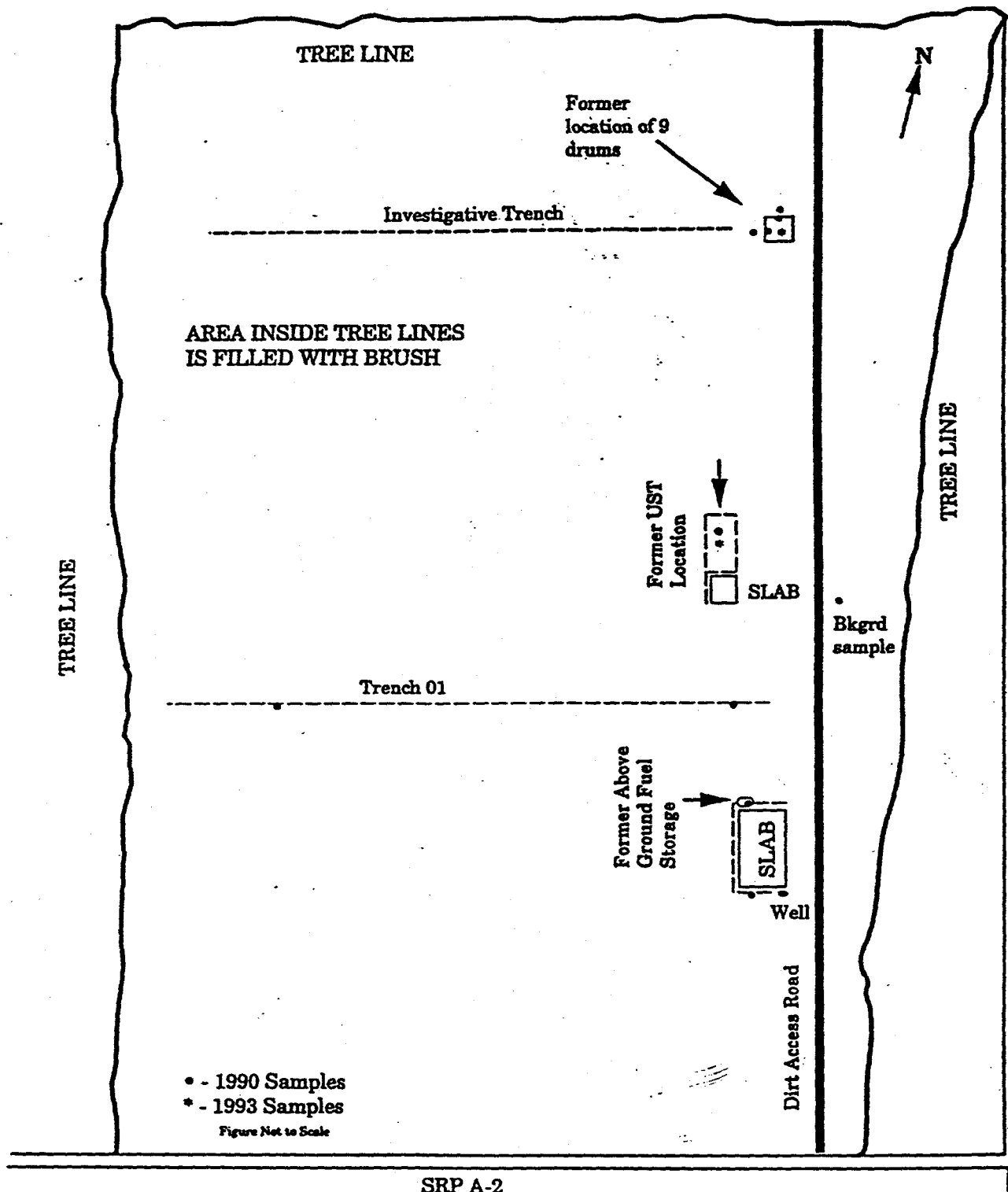


Figure 2-5. Sample Locations for the 1993 Soil Survey

were analyzed for VOCs, TPH, BTEX, and metals.

Table 2-1 and 2-2 summarize the 1993 soil sampling results. Barium, chromium and lead were detected in the samples, but were below background levels. Petroleum hydrocarbons were not detected in the soil samples. Trace levels of 1,1,1-trichloroethane were detected in some samples. All substances were well below any proposed EPA action level.

2.5.4 Conclusions from the Magnetic, GPR and Soil Surveys

Trenching, GPR, and magnetic surveys of Gunsite 720 found no evidence of burial pits or a UST. The soil sampling results indicate there are no substances at Gunsite 720 that trigger any regulatory action levels. In most cases, the substances detected are below background levels. In addition, the nine empty, 30-gallon drums found at the unit were excavated, screened and removed. The results of the investigation indicate that no hazardous substances have been managed or are present at Gunsite 720.

2.5.5 Identification of Human Health Chemicals of Potential Concern (COPCs)

Soil samples were collected in four primary areas at the unit: around a large concrete slab, around a small concrete slab, within trench 01, and around the empty 30-gallon drums. No samples from the investigative trench were obtained because no evidence of any disturbance was found. In addition a background soil sample was collected across a gravel road in a wooded area upgradient from the site.

All analyses were performed in accordance with standard EPA Contract Laboratory Program (CLP) protocols. An evaluation of the laboratory QA/QC documentation proved that adequate controls were applied and that the resulting analytical data are of sufficient quality for use in a CERCLA risk assessment. All laboratory control samples responded within instrument and method limits.

TABLE 2-1
1993 Soil Sample Results: UST Area
(Units in ppm unless otherwise specified)

ID	GS720	GS720	GS720	GS720
Sample Depth	2001	2002	2003	2004
Meters (Feet)	1.2-1.8 (4-6)	2.4-3.1 (8-10)	3.1-3.7 (10-12)	3.7-4.3 (12-14)
TPH (gas)	ND	ND	ND	ND
TPH non-purgeable:				
diesel	ND	ND	ND	ND
kerosene	ND	ND	ND	ND
Benzene	ND	ND	ND	ND
Toluene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
M,P-Xylene	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND

ND = not detected

TABLE 2-2
1993 Soil Sample Results: Drum Area
(Units in ppm unless otherwise specified)

ID	GS720	GS720	GS720	GS720	GS720	GS720
Depth	3001	3002	3003	3004	3005	3006
Meters	1.2-1.8	2.4-3.1	3.1-3.7	3.7-4.3	4.3-4.9	4.9-5.5
(Feet)	(4-6)	(8-10)	(10-12)	(12-14)	(14-16)	(16-18)
Silver	ND	ND	ND	ND	ND	ND
Arsenic	ND	2.31	1.37	1.04	ND	ND
Barium	26.4	30.7	10.9	11.9	6.59	8.55
Cadmium	ND	ND	ND	ND	ND	ND
Chromium	2.99	14.4	16.32	12.3	4.04	4.21
Mercury	ND	ND	ND	ND	ND	ND
Lead	4.65	5.81	4.17	3.24	ND	ND
Selenium	ND	ND	ND	ND	ND	ND
1,1,1 TCE	0.028	0.02	0.02	0.015	ND	0.016

ND = not detected

2.5.5.1 Chemicals of Potential Concern

Four metals (barium, chromium, mercury, and lead) were detected above unit-specific background levels (Table 2-3). Two of the metals, barium and mercury, did not exceed twice the unit-specific background levels. Barium was detected at 53.9 mg/kg and twice the unit-specific background level is 64.2 mg/kg. A comparison of the barium concentration to SRS background levels, detected by Looney et al (1990), in samples taken within 3000 feet of the Gunsite shows that the level of barium detected is within the naturally occurring range for barium in upland sandy soils.

Mercury was detected at 0.12 mg/kg and twice the unit-specific background level is 0.22 mg/kg. The background level for mercury is reported as the detection limit of 0.11 mg/kg. While the background sample did not detect mercury above the detection limit of 0.11 mg/kg, the detected level in one sample of 0.12 mg/kg is the lowest quantifiable level that can be detected. Additionally, the SRS background range for mercury is from 0.01 mg/kg to 0.89 mg/kg in upland sandy soils (Looney, 1990) and the mercury detected at the Gunsite falls within the lowest quartile of the SRS range. Furthermore, the quality control report for this sample states that the laboratory control standards were within the control limits of 80% to 120% for mercury. The 80% to 120% control limit is a measure of the analytical method's accuracy. The control limit range for the method detection limit of 0.11 mg/kg is 0.088 mg/kg to 0.132 mg/kg. The control limit range of the 11 mg/kg method detection limit and the 0.12 mg/kg sample result overlap by a significant amount, supporting the probability that the 0.12 mg/kg sample result is an artifact of the analytical method and does not represent an actual environmental concentration. This probability coupled with the fact that this is the only one of four environmental (and one background) samples to yield a result above the method detection limit is convincing evidence that the mercury detected is a spurious result.

Lead was detected at 6.8 mg/kg, with a unit-specific background level of 2.6 mg/kg, and the EPA soil cleanup guideline for lead in soil is 400 mg/kg (EPA, 1994).

Chromium was detected at 16.3 mg/kg, with a unit-specific background level of 3.0 mg/kg. The EPA Region III Risk-Based Concentration (RBC) for ingestion of chromium

TABLE 2-3
Comparison of Maximum Soil Concentrations with Unit-Specific and SRS
Background Levels and EPA Region III RBCs. 1990 and 1993 data.

Constituent	Gunsite 720 Soil Sample Concentration		EPA Region III RBC *	SRS Soil Background Levels**
	Maximum	Background		
ORGANICS (mg/kg)				
TPH (1990)	12	ND	—	NA
1,1,1-Trichloroethane (1993)	0.028	NA	7,000	NA
METALS (mg/kg)				
Barium (1990)	53.9	32.1	5500	50.4-65.13
Chromium (total) (1993)	16.32	3.0	390***	1.31-105.1
Mercury (1990)	0.12	0.11	23	< 0.01-0.1
Lead (1990)	6.8	2.6	400	< 1.0-16.67

* EPA Region III Risk-Based Concentration Table (soil ingestion-residential scenario), March, 1995

** Looney et al, 1990

*** Published action level for (Cr) is for the Cr⁺⁶, Cr⁺³ is 78000 ppm

NA Not Available/Not Analyzed

ND Not Detected (below analytical limits)

in soil by residents is 78,000 mg/kg for Cr^{+3} and 390 mg/kg for Cr^{+6} (EPA, 1995). The Soil Screening Levels for transfers from soil to groundwater from the EPA Region III RBC list is 19 mg/kg for Cr^{+6} in soil (there is no listing for Cr^{+3} and the +6 form of chromium is the most toxic). The level of chromium detected in the Gunsite soils falls below all of the risk-based concentrations, therefore, chromium would not be considered for analysis in a risk assessment.

Table 2-3 contains data for the samples in which substances were detected, the corresponding background values, and the EPA Region III Risk-Based Concentrations (considering the soil ingestion-residential scenario). This table illustrates the screening of the results.

A review of the unit sampling plan and the resulting soil and soil vapor analytical data for the Gunsite 720 indicate the data are sufficient for use in a unit risk assessment evaluation. This evaluation was conducted to estimate the health or environmental problems that could result from the no further action alternative. The results indicate that the concentrations of all hazardous materials analyzed were near or below natural occurring background levels and/or below any risk-based action levels. Therefore, they pose no risk to human health and the environment.

Based upon screening available evidence, there are no chemicals of potential concern available for evaluation by a CERCLA baseline risk assessment.

2.6 Groundwater Investigation

No groundwater monitoring wells have been installed at this unit, so there is no unit groundwater quality nor water level data available. Based on the topographic location of the unit, the depth to the groundwater table is estimated to be 3 meters (9.8 feet). Natural ground water discharge is to Upper Three Runs Creek. However, since there is no evidence of hazardous disposal at this unit, there was no need to collect water samples.

2.7 Human Population Surveys

There is no resident population on or in close proximity to Gunsite 720 Rubble Pit. The closest worker population to the unit is located in TNX, 4 kilometers (2.5 miles) southeast of the unit (see Figure 1-2). Gunsite 720 Rubble Pit is accessible from SRS Road A-2 to SRS workers and other authorized visitors. At present, the unit is outside the controlled access secured zone, but within the SRS security area and requires authorization for access. In addition, the area has been marked and labeled by the Environmental Restoration Department.

2.8 Ecological Investigation

No ecological investigation was conducted at this unit because there is no evidence that any hazardous material was disposed of at this location.

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3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

3.1 Surface Features

There are no structures other than the concrete slabs located at or near the Gunsite 720 Rubble Pit Unit. The only nearby man-made features are South Carolina Highway 125 about 304.9 meters (1000 feet) east of the unit, and SRS Road A-2 about 30.5 meters (100 feet) to the south. The topography is relatively flat at an elevation of about 45.7 meters (150 feet) above mean sea level (msl).

3.2 Meteorology

Climatology and meteorology of SRS are based on data collected on the unit, at Bush Field in Augusta, Georgia (DOE, 1990), and from the H-Area tower and A-Area shelter (DOE, 1991).

3.2.1 Regional Climatology

The SRS region has a temperate climate with short, mild winters and long, humid summers. The region is subject to continental influences, but is protected from the more severe winters in the Tennessee Valley by the Appalachian Mountains to the north and northwest, and is often influenced by warm and moist maritime air masses throughout the year. Gently rolling hills with no unusual topographic features that would significantly influence the general climate characterize the unit and the surrounding area.

3.2.2 Temperature and Humidity

The annual average temperature at SRS is 18°C (66.2°F). Monthly averages range from 7°C (45.3°F) in January to 27°C (83.3°F) in July. The annual average relative humidity is 66 percent. The lowest monthly average daily minimum (36 percent) occurs in April, and the highest monthly average daily maximum (98 percent) occurs in August.

3.2.3 Precipitation and Evapotranspiration

The average annual precipitation at SRS is 122 centimeters (48 inches). Precipitation is distributed fairly evenly throughout the year, with the highest precipitation in summer (36.1 cm; 14.2 in). Average precipitation totals for the fall months are less than the average totals for the other seasons, accounting for about 18 percent of the average annual total. For Augusta, precipitation totals greater than 0.025 centimeters (0.01 inches) occur, on average, about 107 days per year.

The average number of days per month with measurable precipitation range from about six in October to about 12 in July. Monthly precipitation extremes in Augusta range from a maximum of about 30 centimeters (11.8 inches), recorded in March 1980, to a trace, observed in October 1959.

The greatest observed rainfall for a 24-hour period was about 15 centimeters (5.9 inches) in August 1964. Hourly observations from Augusta indicate that the rainfall rate is usually less than the 1.3 centimeters (0.5 inches) per hour, although rates greater than 1.3 centimeters per hour can be expected during spring and summer thunderstorms. The calculated 24-hour/100 year rainfall at SRS is 20.8 centimeters (8.2 inches; DOE, 1990).

Although snow can fall from October through March, the average annual snowfall is only 3.0 centimeters (1.2 inches). Large snowfalls are rare. The National Weather Service (NWS) station in Augusta, Georgia, observes maximum total snowfalls for 24-hour and monthly periods. From 1951 to 1987, the maximum snowfall in the SRS area was 36 centimeters (14.2 inches), recorded in February 1973 (DOE, 1990).

Evapotranspiration in the southeastern Coastal Plain physiographic province is approximately 88.9 cm/yr (35 inches/yr), which is 73 percent of the reported average annual precipitation (DOE, 1990). The remaining precipitation represents the amount available to surface streams for overland flow and to groundwater for recharge.

3.2.4 Wind

Wind data measured at the 6 meter (20 feet) level at the H-Area tower for the period 1982-1986 indicate that there is no predominant wind direction at SRS. The maximum directional frequency is from the northeast (about 9 percent of the time). Figure 3-1 shows an annual wind rose for H-Area, which is near the center of SRS. These data indicate that the observed wind directions tend to favor the southwest and northeast quadrants (28 and 30 percent of the time respectively) in relation to the northwest (20 percent) and the southeast (22 percent) quadrants. For all data, winds from the northeast sector occurred most frequently (nearly 10 percent of the time). Winds from direction sectors in the southwest quadrant also occurred with a relatively high frequency (7 to 8 percent of the time).

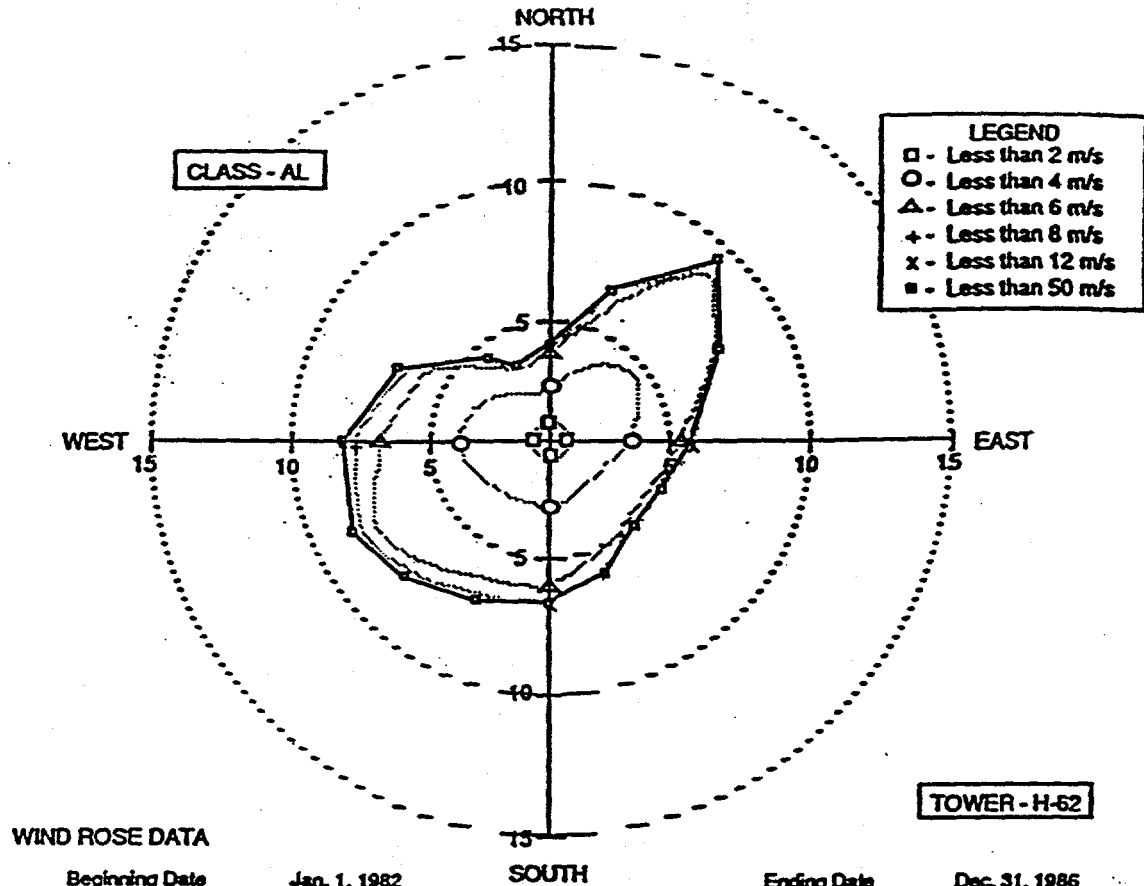
The average wind speed, from onsite data, from 1982 to 1986 was 3.25 m/s (7.3 mph). Hourly wind speeds less than 2 meters per second occurred about 9 percent of the hours. For about half of the hours, wind speeds were less than 4 m/s (9 mph). From 1975 to 1979 onsite data, the average speed was greatest during the winter (3.35 m/s; 7.5 mph) and least during the summer (2.48 m/s; 5.5 mph).

Winter storms in the SRS area occasionally bring strong and gusty winds with speeds as high as 32 m/s (72 mph). On occasion, SRS instruments have recorded winds as high as 39 m/s (87 mph) during winter storms. Thunderstorms can generate winds as high as 18 m/s (40 mph) and even stronger gusts. During the history of the Site, only Hurricane Gracie, in September 1959, had onsite winds stronger than 34 m/s (76 mph; DOE, 1990).

3.2.5 Thunderstorms

On average, 56 thunderstorm days occur per year on the site. Summer thunderstorms occur primarily during the late afternoon and evening; they can be accompanied by strong winds, heavy precipitation, or, less frequently, hail (DOE, 1990). On average, based on observations in a one-degree square of latitude and longitude, hail occurred once every two years.

Plot and Table Indicate Direction From Which the Wind Blows



WIND ROSE DATA

Beginning Date Jan. 1, 1982
Beginning Time (Zulu) 0000
Observations (All Classes) 36262

Ending Date Dec. 31, 1986
Ending Time (Zulu) 2400
Observations (This Class) 35252

Direction	Number of Observations ¹ at Indicated Wind Speed ²						Average Wind Speed	Total Observ ¹	Percent Time at Indicated Wind Speed ²						Total % Time
	0-2	2-4	4-6	6-8	8-12	>12			0-2	2-4	4-6	6-8	8-12	>12	
N	204	571	460	80	13	0	2.96	1328	0.58	1.62	1.30	0.23	0.04	0.00	3.77
NNE	190	896	911	131	13	0	3.31	2141	0.54	2.54	2.58	0.37	0.04	0.00	6.07
NE	234	1341	1559	229	18	0	3.38	3381	0.66	3.80	4.42	0.65	0.05	0.00	9.59
ENE	229	1266	1078	122	1	0	3.19	2696	0.65	3.59	3.06	0.35	0.00	0.00	7.65
E	191	980	737	85	2	0	3.13	1995	0.54	2.78	2.09	0.24	0.01	0.00	5.66
ESE	138	832	631	102	7	0	3.24	1710	0.39	2.36	1.79	0.29	0.02	0.00	4.85
SE	153	743	722	106	25	0	3.27	1749	0.43	2.11	2.05	0.30	0.07	0.00	4.96
SSE	171	861	927	140	25	0	3.21	2124	0.49	2.44	2.53	0.40	0.07	0.00	6.03
S	170	923	1050	226	18	0	3.46	2387	0.48	2.62	2.96	0.54	0.05	0.00	6.77
SSW	214	928	1051	218	33	1	3.25	2445	0.51	2.63	2.96	0.52	0.09	0.00	6.94
SW	226	1075	1105	220	31	0	3.30	2657	0.54	3.05	3.13	0.52	0.09	0.00	7.54
WSW	228	1197	1150	243	71	2	3.38	2901	0.55	3.40	3.29	0.59	0.20	0.01	8.23
W	234	1082	1074	342	124	2	3.35	2858	0.55	3.07	3.05	0.97	0.35	0.01	8.11
WNW	241	863	922	277	113	2	3.33	2438	0.56	2.50	2.52	0.79	0.32	0.01	6.92
NW	197	584	483	125	24	0	3.97	1413	0.56	1.55	1.37	0.35	0.07	0.00	4.01
NNW	175	463	299	75	17	0	2.80	1029	0.50	1.31	0.85	0.21	0.05	0.00	2.92
No Direction	0	0	0	0	0	0	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avg. Speed ²	1.25	3.01	4.80	6.54	9.01	13.93	3.25								
Total Observations ¹	3195	14625	14169	2721	535	7		36262							

¹ An observation is a record covering a 1-hour period of time.

² Wind speed in meters/sec (m/s).

Annual Wind Rose of Hourly Averaged Winds from H-Area Tower, 1982-86.
(Directions Are Sectors from Which Wind Blows.)

Source: DOE, 1990

Figure 3-1. Annual Wind Rose for H Area

3.2.6 Ice and Snow

Winter storms that produce more than 2.5 centimeters (1 inch) of ice or snow are rare. Snowfalls of 2.5 centimeters or greater occur once every five years on the average. Any accumulation of snow rarely lasts longer than three days.

For a nine year period of record, storms resulting in an accumulation of ice on exposed surfaces occurred in the SRS vicinity an average of about once every two years. Based on a 50-year period of record (1920 to 1969), a 1.3 centimeter (0.5 inches) accumulation of ice would occur once every 25 years (DOE, 1990).

3.2.7 Fog

Heavy fog, reducing visibility to less than 0.4 kilometer, occurred at Augusta on a average of about 28 days per year (1951 to 1969). Occurrences averaged about three days per month during the fall and winter and slightly more than one day per month during spring and summer. Most of the heavy fog observed at Augusta is caused by its proximity to the Savannah River.

3.2.8 Tornadoes

The estimated probability of a tornado striking a point at SRS is $7.0E-5$ /yr. (DOE, 1991). About half the total number of observed tornadoes, and most of the tornadoes resulting in severe or devastating damage, occurred in March, April, and May. However, tornadoes have been observed in the SRS area in every month of the year. Investigations of tornadoes occurring near the Site in 1975 and 1976 indicated wind speeds between about 45 m/s (100 mph) and 78 m/s (174 mph; DOE, 1990).

Since operations began at SRS in 1953, six tornadoes have been confirmed on or near SRS. Nothing more than light damage was reported from any of these storms, with the sole exception of a tornado in October 1989. That tornado caused considerable damage to timber resources in an unpopulated wooded area of SRS (DOE, 1991).

3.2.9 Hurricanes

Thirty-six hurricanes caused damage in South Carolina from 1700 to 1987. From 1899 to 1980, 13 hurricanes were experienced in South Carolina and Georgia, for an average frequency of about one hurricane every six years; however, the observed interval between hurricane occurrence has ranged from two months to 27 years. Three of these hurricanes were classified as major. Instruments at SRS measured winds associated with Hurricane Gracie, which passed to the north of the Site on September 29, 1959, as high as 34 m/s (76 mph). No other hurricane-force wind has been measured on the Site. On September 22, 1989, Hurricane Hugo struck the coast of South Carolina near Charleston; sustained winds recorded at SRS were 17 m/s (38 mph).

Because the Site is approximately 161 kilometers (100 miles) inland, winds associated with tropical weather systems usually have diminished below hurricane force (sustained speeds of 121 kilometers per hour (75 mph) or greater). Extreme rainfall and tornadoes, which frequently accompany tropical weather systems, usually have the most significant impact on facility operations (DOE, 1990)

3.3 Surface Water Hydrology

Gunsite 720 Rubble Pit Unit is situated on soil mapped as part of the Wagram Series. The Wagram Series consists of well-drained, moderately permeable soils that formed in beds of loamy marine sediment. These soils are on relatively broad ridgetops and side slopes of the Coastal Plain. Based on the soil description and the absence of perennial or intermittent streams in close proximity to the unit, it is unlikely that hazardous constituents would be carried from the unit by surface water runoff. The local terrain is flat, with drainage to Upper Three Runs Creek to the southeast of the unit.

3.4 Geology of SRS

The subsurface geology underlying SRS includes crystalline basement rock and Triassic sediments which are overlain by Cretaceous and younger Coastal Plain sediments (Price, 1988). The crystalline basement rock is composed of chlorite-hornblende schist,

hornblende gneiss, and lesser amounts of other types of crystalline rock. This bedrock is buried beneath approximately 274.4 meters (900 feet) of sediments. The Triassic sediments occur in the southern portion of SRS. Sediments of the Triassic bedrock are composed of poorly sorted conglomerate, sandstone and mud-rock, and are generally dark red in color. The stratigraphic units of the Coastal Plain, from oldest to youngest, are the Cape Fear Formation, the Lumbee Group, the Black Mingo Group, the Orangeburg Group, the Barnwell Group, and the Upland Unit (Figure 3-2).

The Cape Fear Formation is composed of Upper Cretaceous, poorly sorted, silty to clayey quartz sands and interbedded clays. The Cape Fear thickens across SRS, ranging from 9.2 meters (30 feet) at the northwest SRS site boundary to more than 54.9 meters (180 feet) at the southeast SRS site boundary.

The Lumbee Group (Upper Cretaceous) is subdivided into the Middendorf and the Black Creek Formations, and the Steel Creek Member of the Peedee Formation. The lower contact between the Middendorf and the Cape Fear Formations is a sharp erosional unconformity. The Middendorf Formation is dominantly made up of medium to coarse sand with some thin kaolinitic clay lenses. The Black Creek Formation is generally comprised of interbedded sands, silts and clays. The Peedee Formation (Steel Creek Member) contains poorly to well-sorted, silty-to-clayey sands in the lower section and interbedded clayey-sands in the upper section. The thickness of the Lumbee Group is from 115.9 meters (380 feet) to more than 213.4 meters (700 feet) from the northwestern SRS boundary to the southeastern SRS boundary, respectively.

The Lumbee Group formations are overlain unconformably by the Paleocene to Eocene aged Black Mingo Group. Locally, the Black Mingo Group Formations dip to the southeast, and range in thickness from 21.3 meters (70 feet) at the northwestern boundary of the SRS to approximately 45.7 meters (150 feet) near the southeastern boundary. The Black Mingo Group at the SRS is comprised of, from older to younger, the Ellenton Formation (Early Paleocene), the Snapp Member of the Williamsburg Formation (Late Paleocene), and the Fourmile Member of the Fishburne Formation (Early Eocene).

The Ellenton Formation consists mostly of gray, poorly sorted, micaceous, lignitic, silty and clayey quartz sand interbedded with gray clays. The Ellenton is approximately 12.2

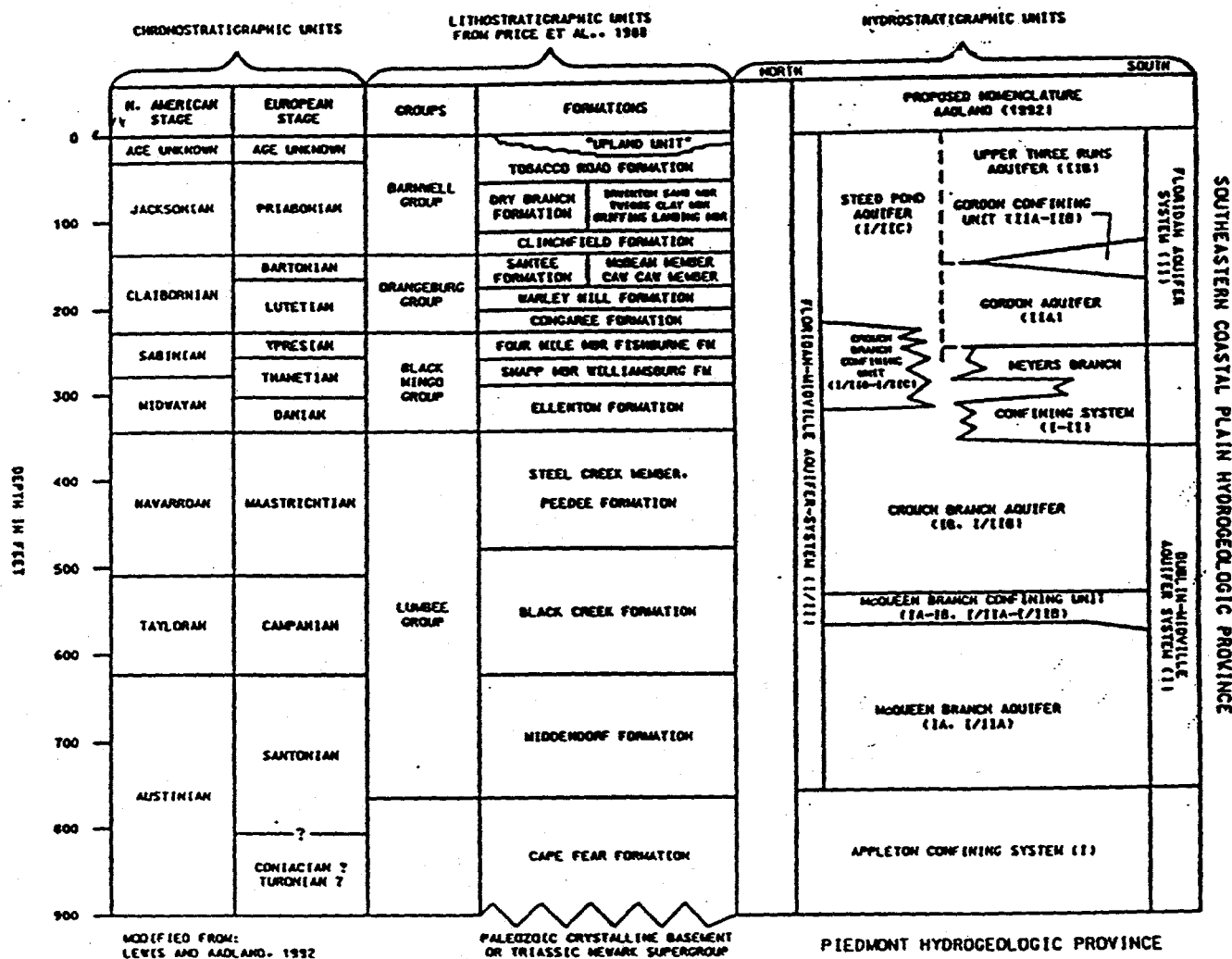


Figure 3-2 Comparison of Chronostratigraphic, Lithostratigraphic, and Hydrostratigraphic Units at SRS

meters (40 feet) thick at the northwestern SRS boundary and thickens to approximately 30.5 meter (100 feet) at the southeastern SRS boundary.

The Snapp Member of the Williamsburg Formation is typically comprised of silty, medium to coarse grained quartz sand interbedded with clay. The Williamsburg thickens from 9.2 meters (30 feet) at the northwestern SRS boundary to 15.2 meters (50 feet) at the southeastern SRS boundary. The Fourmile Member of the Fishburne Formation consists of tan, orange, yellow, brown, and white clayey and micaceous sand (Fallaw, 1991). The Fishburne has been traced from well PBF-3 into the A/M area, the only locale of known distribution at SRS. The Fourmile section is 4.6 meters (15 feet) to 22.9 meters (75 feet) thick in this area.

The Black Mingo Group is overlain by the Middle Eocene age Orangeburg Group. The Orangeburg Group outcrops at many areas of low elevation around the SRS. The thickness of the Group ranges from approximately 30.5 meters (100 feet) at the northwestern SRS boundary to 48.8 meters (160 feet) at the southeastern boundary. The Orangeburg Group is made up of the lower Middle Eocene Congaree Formation and the upper Middle Eocene Santee Limestone Formation.

The Congaree Formation consists of yellow, orange, tan, gray and greenish gray, well sorted, quartz sands with thin clay laminae. The top section of the Congaree Formation is cemented with silica in many areas of the SRS and is slightly calcareous in other areas. The Congaree Formation is approximately 18.3 meters (60 feet) thick at the northwestern SRS boundary and thickens to approximately 25.9 meters (85 feet) near the southeastern SRS boundary.

The Warley Hill Formation is a fine-grained, often glauconitic sandstone occurring at or near the base of the Santee Formation at SRS (Aadland et al, 1992). The Warley Hill Formation and the Caw Caw Member of the overlying Santee Formation make up what has been informally referred to in many SRS reports as the "green clay". The "green clay" is composed of glauconitic, silty and clayey quartz sands and silty clays. Clay beds in this interval are laterally discontinuous in the northernmost SRS areas (Lewis and Aadland, 1992). The overlying Santee Formation is subdivided into the Caw Caw and the McBean Members, and varies in lithology from carbonates and calcareous quartz sands to quartz

and glauconitic sands and clays. The uppermost member, McBean, consists of limestone overlain by quartz sand. The thickness of the formation ranges from 12.2 meters (40 feet) to more than 24.4 meters (80 feet) from the northwestern SRS boundary to the southeastern SRS boundary, respectively.

The Orangeburg Group is overlain by the Late Eocene deposits of the Barnwell Group. The Barnwell Group at the SRS is subdivided into the Clinchfield, Dry Branch, and Tobacco Road Formations. The Clinchfield Formation is present at some SRS locations, but it is not continuous enough to be correlated across the site. The quartz sand of the Clinchfield Formation has been identified at the SRS only when the contrasting carbonates of both the Griffins Landing Member of the Dry Branch Formation (stratigraphically above) and the McBean Member of the Santee Formation (stratigraphically below) are present, with the sand between them. The Dry Branch Formation is divided into (from oldest to youngest) the Griffins Landing, Twiggs Clay, and Irwinton Sand Member. This formation outcrops in several places across the SRS and ranges in thickness from 15.2 meters (50 feet) from the northwest boundary to 24.4 meters (80 feet) near the southeastern SRS boundary.

The Griffins Landing Member of the Dry Branch Formation is composed of carbonates that occur sporadically at the SRS. The Irwinton Sand Member contains tan, yellow, and orange, moderately sorted quartz sand with interlaminated clays. The Twiggs Clay Member of the Dry Branch Formation is informally called the "tan clay." This clay lithofacies, which is tan, light gray, and brown, varies in thickness up to 3.7 meters (12 feet) at the SRS, but is not laterally continuous.

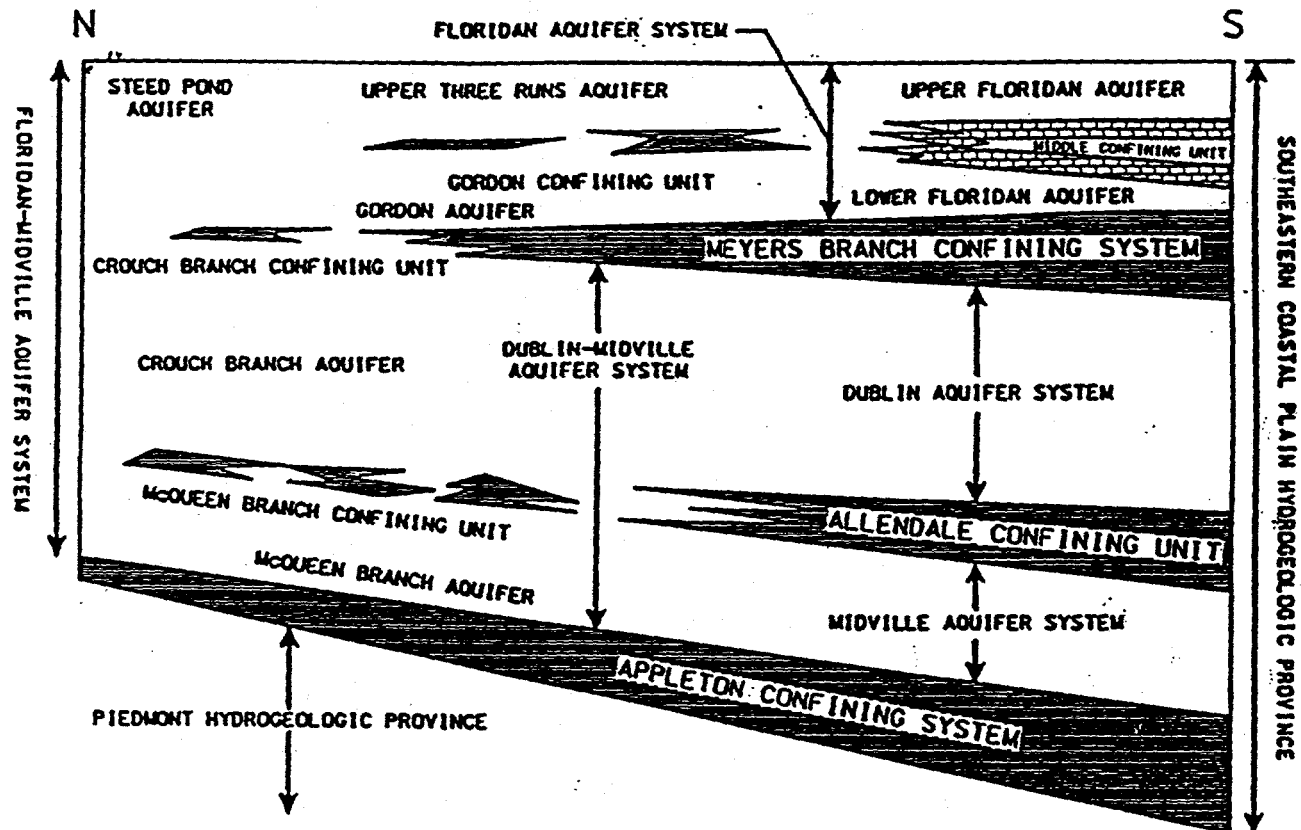
The Tobacco Road Formation, which overlies the Dry Branch Formation, consists of red, fine to coarse, moderately to poorly sorted, clayey quartz sand with minor clay laminae. The Tobacco Road outcrops at the surface at many locations throughout the site and ranges in thickness from 6.1 to 9.1 meters (20 to 30 feet).

The Upland Unit (previously mapped at SRS as the Hawthorn Formation) is composed of poorly sorted, clay-to-silty sands, with lenses and layers of pebbly and cobbly quartz sands with extreme lateral and vertical variation. (Price, 1988). The presence of the Upland Unit in this area is inconsistent, occurring predominantly at higher elevations around SRS.

3.5 Hydrogeology

A multilayer hydrologic system exists in the Coastal Plain sediments at the SRS. Confining units within the system are interspersed with more transmissive units. Aadland and Bledsoe (1990) developed an alpha numeric hydrostratigraphic nomenclature system for SRS and Aadland et al (1992) introduced proposed names for the systems, units and zones (Figure 3-2). Within this nomenclature, the basement complex underlying the Coastal Plain deposits is referred to as the Piedmont Hydrogeologic System. This system is overlain by three aquifer systems of Coastal Plain deposits, the Midville, the Dublin, and the Floridan Aquifer Systems, separated by the Allendale and Meyers Branch Confining Systems. These Aquifer systems are separated from the lower Piedmont Hydrogeologic System by the Appleton Confining System. The Appleton Confining System is composed of poorly sorted, clayey sediments of the Cape Fear Formation. Confining clay sediments of the middle Black Creek Formation make up the Allendale Confining Unit which separates the Midville and Dublin Aquifers. The Midville Aquifer is composed of sands of the Middendorf Formation and the lower sands of the Black Creek and lower Peedee Formations. As the confining systems and units thin and become discontinuous in a northerly direction at the SRS, the Midville and Dublin Aquifer Systems are combined to form a single Dublin-Midville Aquifer System. Figure 3-3 is a graphic illustration of the hydrogeologic nomenclature for the SRS region. The reader is referred to Aadland et al (1992) for the most recent description of SRS hydrogeology.

The Floridan Aquifer System is divided into the Gordon Aquifer and the Upper Three Runs Aquifer by the Gordon Confining Unit. Congaree/Fourmile sands comprise the Gordon Aquifer, and sands of the Santee Limestone and Tobacco Road Formation comprise the Upper Three Runs Aquifer. Warley Hill and Caw Caw clays (including the "green clay") comprise the Gordon Confining Unit. Northwest of Upper Three Runs Creek (UTRC), the individual confining beds separating the two Aquifer Systems become thin and discontinuous.



SOURCE: LEWIS AND AADLAND, 1992

Figure 3-3 Hydrogeologic Nomenclature for the SRS Region

3.6 Geology and Hydrology of the Gunsite 720 Rubble Pit Unit

The amount of detailed geologic and hydrogeologic information on the Gunsite 720 Rubble Pit Unit is limited. There has been no need to make a detailed investigation of the geology and hydrology of this area mainly because of its location on the western edge of the site, its distance from the more heavily industrialized site locations, and its lack of history as a waste area.

3.7 Demography and Land Use

3.7.1 Demographics

SRS is located approximately 40 kilometers (25 miles) southeast of Augusta, Georgia, and 32 kilometers (20 miles) south of Aiken, South Carolina. According to 1990 census data (Rand McNalley, 1992) the average population densities (in people per square mile) for the surrounding South Carolina counties are 111 for Aiken County, 36 for Barnwell County, and 28 for Allendale County. For the surrounding Georgia counties the densities are 228 for Columbia County, 524 for Richmond County, 25 for Burke County and 21 for Screven County. The population within an 80.5 kilometer (50 mile) radius of SRS is 634,784 people.

The estimated population for the area in the year 2000 is projected to be 852,000 (Rand McNalley, 1992). This estimate was calculated utilizing the 1970 to 1980 growth rate of each county in an 80.5 kilometer (50 miles) radius, assuming that the same rate of growth would continue into the future. The calculation assumed that the population would remain constant for counties that experienced a negative population growth between 1970 and 1980.

Calibrated demographic data is available for the six-county area that provides 90 percent of the SRS work force (DOE, 1994). These are Aiken, Allendale, Bamberg and Barnwell Counties in South Carolina and Richmond and Columbia Counties in Georgia. The population in those six counties increased 13 percent between 1980 and 1990, from 376,000 to 425,607 and is expected to increase to 474,820 by the year 2000 (DOE,

1992). A disproportionate share of the six county population increase was concentrated in Columbia County where the population increased more than 55 percent to 66,031 between 1980 and 1991.

3.7.2 Land Use

Less than 5 percent of the existing land in the area surrounding SRS is devoted to urban and developed uses (DOE, 1990). Most of the urbanized development in the area has occurred in and around the cities of Augusta, Georgia and Aiken, South Carolina. Agriculture accounts for 24 percent of total land use; forests, wetlands, water bodies, and unclassified land that is predominantly rural accounts for about 70 percent of the total land use. A projected 2 percent increase in the development of urban land surrounding SRS is expected by the year 2000.

Less than 5 percent of the total SRS land area is used by facilities engaged in the production of special nuclear materials. Reservoirs and ponds comprise approximately 13 square kilometers (5 square miles) of SRS. The remainder of the 780+ square kilometers (300+ square miles) area is undeveloped.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 Results of Data Usability Evaluation

The field investigation for Gunsite 720 Rubble Pit Unit was conducted prior to the establishment of a formal data validation program at SRS. Data collected were subjected to the QA/QC standards in use at that time and considered to be acceptable by EPA Level 3 criteria. Information on the QA/QC methods employed during the investigation are provided in the *RFI/RI Plan for the Gunsite 720 Rubble Pit Unit, WSRC-RP-90-1049* (WSRC, 1990). Additional information on the QA/QC procedures used for this unit are provided in Appendix B.

4.2 Results of Site Characterization

Data collected during Preliminary Unit Evaluation, Unit Screening, and field investigations found no evidence of contamination at Gunsite 720 Rubble Pit Unit. The magnetic survey showed no signs of any buried materials including the UST that was previously located at the unit. The GPR survey showed some signs of prominent diffractions possibly indicating buried pipes or metallic objects. However, trenching operation in the area of the GPR survey found only localized areas of household garbage. No tanks were found but wires, two buried pipes and a possible sewerline were uncovered.

An analysis of soil samples collected in 1990 and 1993 show that all materials detected in the soil are at or below background levels. The only hazardous substances exceeding their respective unit-specific background concentrations are acetone (laboratory artifact), bis(2-ethylhexyl) phthalate (laboratory artifact), methylene chloride (laboratory artifact), barium, chromium, lead, and total mercury. Figure 4-1 shows the location and concentration of the metals which exceed the unit-specific background level. When compared to two times background levels, lead and chromium exceed the levels but only by a small margin (Table 4-1).

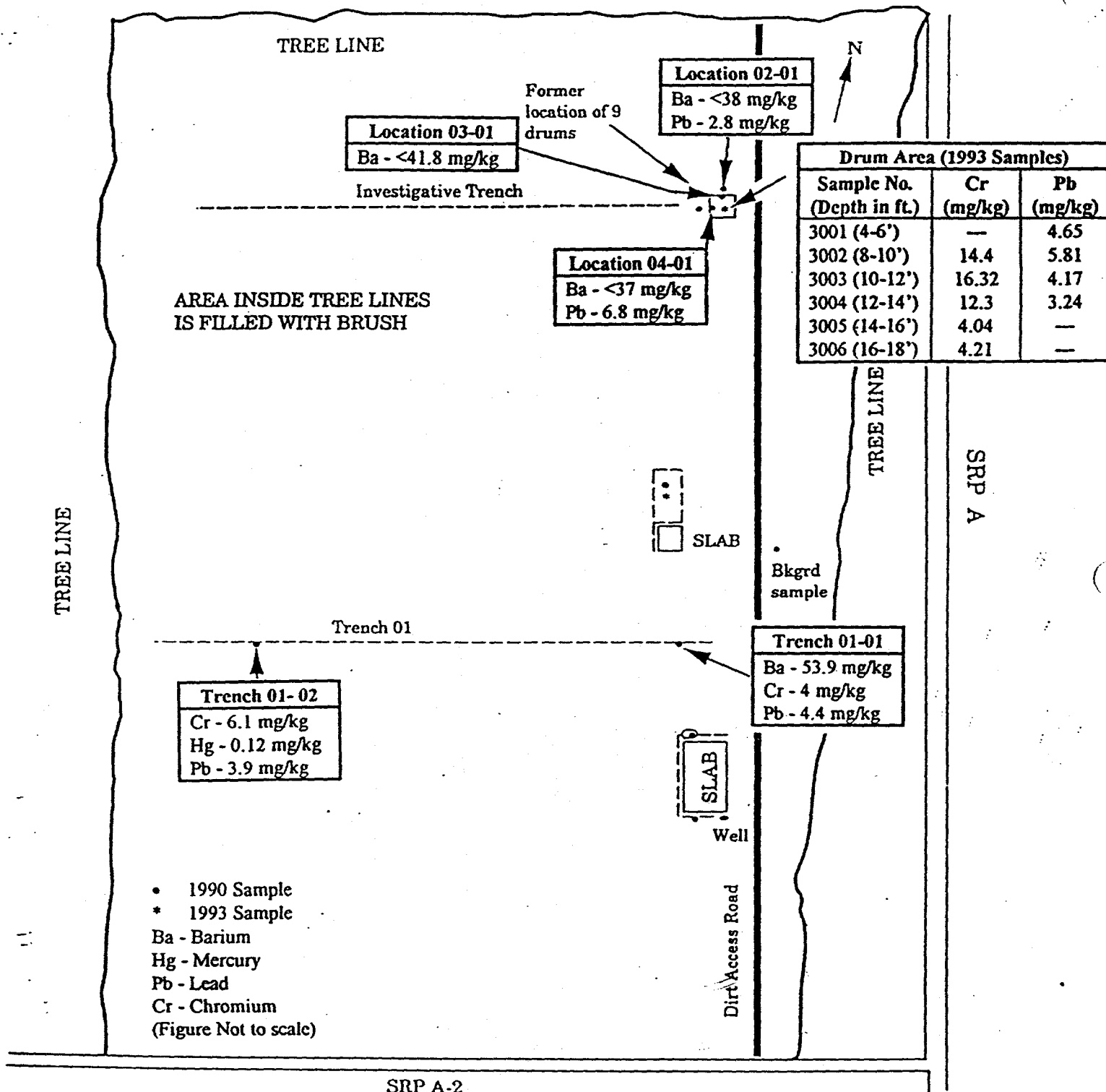


Figure 4-1 Map Showing the Location and Concentration of Metals Which Exceed the Unit-Specific Background Level.

TABLE 4-1
COMPARISON OF MAXIMUM SOIL CONCENTRATIONS
WITH BACKGROUND LEVELS FOR
GUNSITE 720 RUBBLE PIT UNIT

Hazardous Substance*(units)	Maximum Soil Concentration - Unit Screening	Unit-Specific Background Level	Two times Unit-Specific Background Level	SRS Media Background Level**	Southeastern U.S.Level** *
Acetone (µg/kg)	24B	17B	34	---	---
Bis(2-ethylhexyl) phthalate (µg/kg)	660	410	820	---	---
Methylene Chloride (µg/kg)	14B	11B	22	---	---
Total Petroleum Hydrocarbons (µg/kg)	12	NA	NA	---	---
Gross alpha (pCi/g)	20	23	46	---	---
Gross beta (pCi/g)	4	4	8	---	---
Barium (mg/kg)	53.9	< 32.1	< 64.2	50.4-65.13	225
Chromium (mg/kg)	16.32	3	6	1.31-105.1	---
Total mercury (mg/kg)	0.12	< 0.11	< 0.22	< 0.01-0.1	0.1
Lead (mg/kg)	6.8	2.6	5.2	< 1.0-16.67	13

* For substances detected in excess of method detection limit

** data from Looney et, 1990

*** For substances which exceeded the unit-specific background area results; data from Conner and Shacklette, 1975

B Analyte was found in Laboratory Blank.

NA Not Analyzed

As shown in Table 4-1, both acetone and methylene chloride were detected in the laboratory blanks. Bis(2-ethylhexyl)phthalate was detected at 660 $\mu\text{g/kg}$. The Practical Quantitation Limit (PQL) for bis(2-ethylhexyl) phthalate is 660 $\mu\text{g/kg}$ for soils and sediments. The PQL is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Since the highest concentration of bis(2-ethylhexyl) phthalate detected in any sample is 660 $\mu\text{g/kg}$, or the PQL, and bis(2-ethylhexyl) phthalate is known laboratory artifact, the significance of its detection in unit samples is believed to be minimal.

For the four hazardous substance metals which exceeded unit-specific background levels (barium, chromium, lead, and total mercury), a comparison with SRS and southeastern U. S. mean background values was made (Table 4-1). Lead and chromium maximum field concentrations are less than both the maximum SRS background level and southeastern U. S. mean background levels. The maximum field value for barium is significantly less than mean southeastern U. S. background level. The maximum field value for total mercury is less than the SRS mean background level.

Trenching operations at the unit uncovered common household garbage and little construction debris, but no buried tanks. Analytical results of soil samples taken from the trenches and debris identified in the trenches suggest that hazardous waste handling activity at the unit is unlikely as is the existence of buried tanks.

No constituents of concern were identified as a result of the investigations at this unit. The general conclusion reached is that this unit has no contamination.

5.0 CONTAMINANT FATE AND TRANSPORT

Contaminants may migrate in environmental media following release from secondary sources by any of several release or transport mechanisms, including:

- suspension and dispersal by the wind of particulate contaminants or contaminants adsorbed to surface soil particles (fugitive dust generation);
- direct volatilization of volatile organic compounds from surface soil to air
- uptake of soil contaminants by vegetation;
- transport of soil contaminants by storm water runoff to surface water and sediments;
- leaching of deep soil contaminants into groundwater.

In addition to the exposure pathways which result from the above secondary release and transport mechanisms, potential receptors also may be exposed directly to contaminants present in surface soils.

Data collected during Preliminary Unit Evaluation, Unit Screening, and field investigations indicate that materials found in the soils at Gunsite 720 Rubble Pit Unit are within normal background levels found at SRS. Since there is no contamination at this unit there is no need for a model on contaminant fate and transport.

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6.0 RISK ASSESSMENT

6.1 Human Health Assessment

A review of the unit sampling plan and the resulting soil and soil vapor analytical data for the Gunsite 720 (see Table 2-3) indicate the data are sufficient for use in an unit risk assessment evaluation. This evaluation was conducted to estimate the health or environmental problems that could result from the no further action alternative. The results indicate that the concentrations of all hazardous materials analyzed were near or below naturally occurring background levels and/or below any proposed health-based action levels. Therefore, they pose no risk to human health and the environment.

Based upon screening available evidence, there are no potential contaminants of concern available for evaluation by a CERCLA baseline risk assessment and, therefore, there is no determinable risk associated with Gunsite 720.

6.2 Ecological Assessment

Information utilized included recorded existing unit history, preliminary unit evaluation, and unit characterization data. These informational sources form the basis for this ecological characterization. That information can be summarized as follows:

- There is no evidence of contaminant associated vegetation stress or ecological impact related to the unit;
- Review of the unit characterization data indicates that there are no constituents in the physical media analyzed at Gunsite 720 that are different from the unit-specific background condition.

Based on the physical and analytical data obtained for this unit, there appears to be no compelling evidence that waste materials were managed or disposed at Gunsite 720. Therefore, it is reasonable to conclude that the unit, as it is currently characterized,

presents no significant ecological risk. A further detailed ecological risk assessment and characterization would not be warranted.

7.0 SUMMARY AND CONCLUSION

7.1 Summary

An analysis of data collected as a result of the studies performed at Gunsite 720 Rubble Pit Unit indicates that there is no contamination at that unit. Survey data indicate that the substances found in the soils at the unit are within the levels normally associated with SRS background levels.

In addition, it is also reasonable to conclude that, since there is no contamination, the unit presents no significant ecological risk.

7.2 Conclusion

Based on the review of the analytical data and screening techniques used to evaluate all the chemicals of potential concern at Gunsite 720 Rubble Pit Unit, it is recommended that no further remedial action be performed at this unit.

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APPENDIX A

TECHNICAL MEMORANDA ON FIELD ACTIVITIES

Appendix A.1 Ground Penetrating Radar Survey

Appendix A.2 Magnetic Survey

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**APPENDIX A.1
GROUND PENETRATING RADAR SURVEY**

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Final Report

GROUND PENETRATING RADAR INVESTIGATIONS

at

GUNSITE 720
(631-16G)

SAVANNAH RIVER SITE

June, 1993

G.Boyd Sexton
Robert J. Pirkle

Task 21, 29
Subcontract #AA38232N

EXECUTIVE SUMMARY

Ground penetrating radar surveys were executed at Gunsite #720 for the purpose of locating disturbed soil, trenches, pipelines and other targets of interest. The survey was conducted on January 27, 1993 with a return visit on March 25, 1993.

Numerous areas of disturbed soil were observed, several of which contain prominent diffractions thought to represent pipelines or other targets of interest. A 300 Mhz transmitter and antenna were used in the acquisition of the data.

TABLE OF CONTENTS

Executive Summary	i
List of Figures	iii
List of Tables	iv
I. Introduction	1
II. Background	1
III. Acquisition and Processing Parameters	2
IV. Results	2
V. Conclusions	3

LIST OF FIGURES

- Figure 1. GPR Line Location Map
- Figure 2. Sample GPR Section With Illustrated Computerized Interpretation
- Figure 3. GPR Line #1
- Figure 4. GPR Line #2
- Figure 5. GPR Line #3
- Figure 6. GPR Line #4
- Figure 7. GPR Line #5
- Figure 8. GPR Line #6
- Figure 9. GPR Line #7
- Figure 10. GPR Line #8
- Figure 11. GPR Line #9
- Figure 12. GPR Line #10
- Figure 13. GPR Line #11
- Figure 14. GPR Line #12
- Figure 15. GPR Line #13
- Figure 16. GPR Line #14
- Figure 17. GPR Line #15
- Figure 18. GPR Line #16
- Figure 19. GPR Line #17
- Figure 20. GPR Line #18
- Figure 21. GPR Line #19
- Figure 22. GPR Line #20
- Figure 23. GPR Line #21
- Figure 24. GPR Line #22

LIST OF TABLES

Table 1. Coordinates, Bearings, and Distances of GPR Lines

Table 2. Acquisition and Processing Parameters

I. INTRODUCTION

Ground Penetrating Radar (GPR) surveys were run at Gunsite #720 for the purpose of locating trenches, pipelines and subsurface targets of interest. GPR data were acquired on a total of 22 lines totaling 3437 feet as shown on Figure 1 and listed on Table 1. Lines 1-22 contain data recorded inside and around the red ball markers at the gunsite. All lines were recorded with the 300 Mhz antenna, 100 ns range.

II. BACKGROUND AND OBSERVATIONS

At Gunsite #720, anti-aircraft guns were mounted and used for protection against a possible invasion or attack. The guns have been removed and the area is overgrown with brush and trees. There is little or no visual indication that would characterize this as a gunsite.

The weather during field acquisition was cool, windy and cloudy. Personnel on-site during data acquisition were Ken Grace, Clark Sharlock and Art Carion.

III. ACQUISITION AND PROCESSING PARAMETERS

The equipment and software used in the acquisition and processing of the GPR data are listed on Table 2.

IV. RESULTS

The results of the GPR surveys at Gunsite 113 are shown on Figures 3 - 24. A sample GPR section with labeled interpretive information is shown on Figure 2. A typical signature of an area of disturbed soil is labeled so that similar anomalous areas on the actual lines presented on Figures 3 - 24 can be easily recognized. The horizontal scale, vertical time scale, and maximum depth of penetration are also shown on each line. The radar velocity in this area is 6-7 ns per foot.

The gunsite was generally a good data area. Lines 1-22, shown on Figures 3 - 24, contain prominent diffractions possibly indicating pipes or buried metallic objects along the GPR transect. Areas within the red ball markers are distinguished by chaotic returns indicating disturbed soil where trenching or back filling has occurred.

The high amplitude event (red, blue, red, etc.) at 25-30 ns, which occurs almost continuously on each line, may indicate the water table. If this event does represent the water table, it is doubtful that any of the data below this event is valid.

V. CONCLUSIONS

The quality of the data recorded at Gunsite 720 was good. It contains numerous prominent diffractions which represent shallow subsurface targets. Areas of disturbed soil are present indicating previous trenching or excavation. The high amplitude event seen relatively continuous on all lines at about 25-30 ns could possibly be the water table at this location.

TABLE #1
GUNSITE 720 / 631-16G
TABLE OF COORDINATES, BEARINGS, AND DISTANCES

FIGURE	NAME		X EASTING	Y NORTHING	BEARING	DISTANCE	LINE
3	1	START	27385	79914	N 1.7624	W 99	1
	1	END	27383	79979			
4	2	START	27251	79948	S 90.0000	E 142	2
	2	END	27356	79948			
5	3	START	27162	79999	N 85.3719	E 442	3
	3	END	27372	80016			
6	4	START	27363	80057	N 45.0000	W 81	4
	4	END	27362	80058			
7	5	START	27343	80076	N 1.1458	E 88	5
	5	END	27344	80126			
8	6	START	27349	80076	N 1.1233	W 68	6
	6	END	27348	80127			
9	7	START	27356	80075	N 1.1017	W 69	7
	7	END	27355	80127			
10	8	START	27363	80076	N 1.1233	E 71	8
	8	END	27364	80127			
11	9	START	27198	80245	N 77.7047	E 179	9
	9	END	27354	80279			
12	10	START	27200	80256	N 78.3985	E 176	10
	10	END	27351	80287			
13	11	START	27305	79919	N 2.6368	E 461	11
	11	END	27326	80375			
14	12	START	27261	79835	N 6.0685	W 609	12
	12	END	27197	80437			
15	13	START	27233	80394	S 14.6499	E 248	13
	13	END	27296	80153			
16	14	START	27351	80307	S 1.7357	W 67	14
	14	END	27349	80241			
17	15	START	27381	80089	S 90.0000	W 74	15
	15	END	27301	80089			
18	16	START	27300	80106	S 90.0000	E 76	16
	16	END	27381	80106			
19	17	START	27380	80123	N 89.2838	W 76	17
	17	END	27300	80124			
20	18	START	27301	80140	S 90.0000	E 76	18
	18	END	27380	80140			
21	19	START	27343	80034	S 0.0000	W 53	19
	19	END	27343	79982			
22	20	START	27216	79964	N 3.3949	W 103	20
	20	END	27209	80082			
23	21	START	27170	79940	N 0.0000	W 115	21
	21	END	27170	80058			
24	22	START	27381	79993	S 89.3839	W 64	22
	22	END	27288	79992			

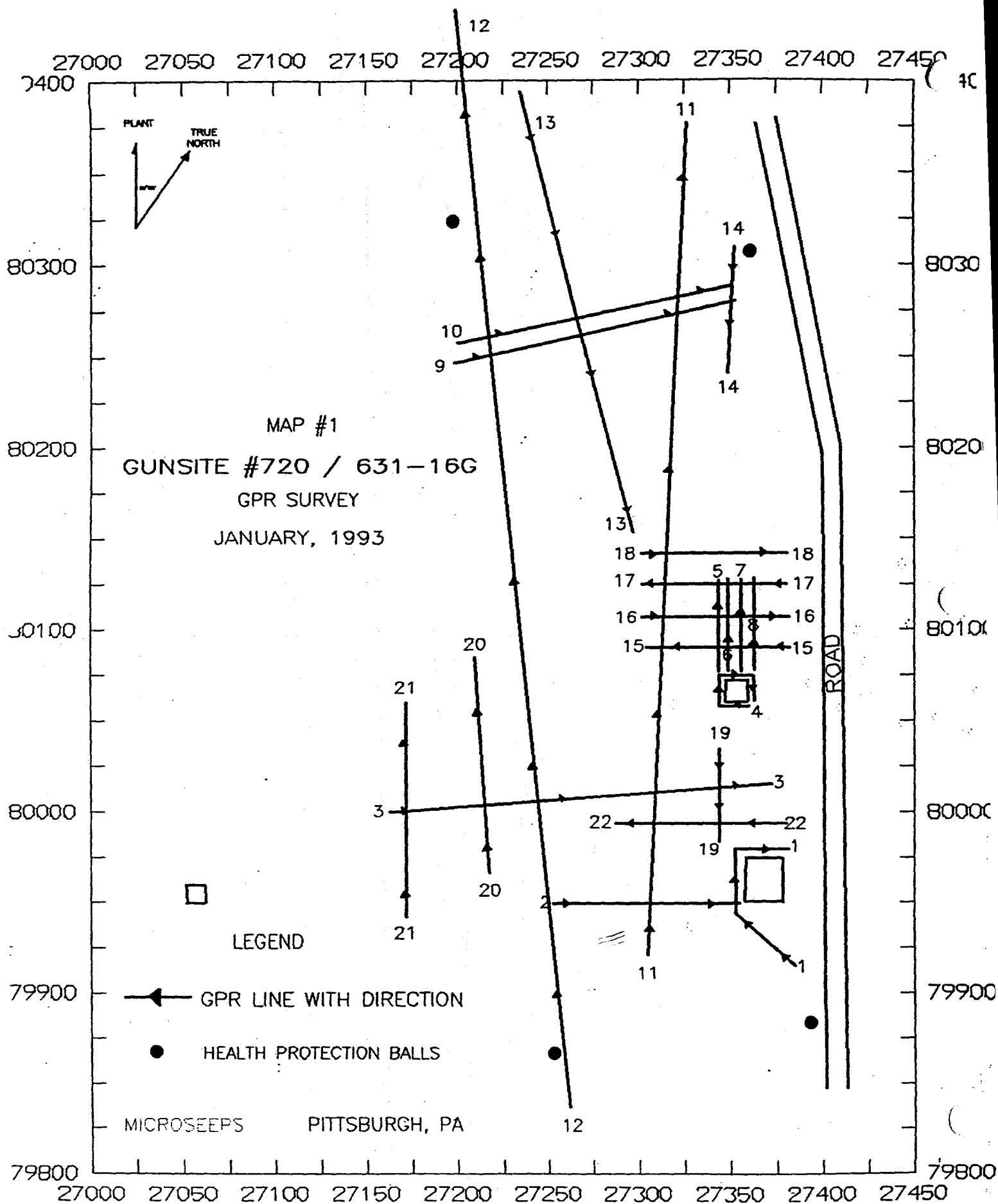
TOTAL FOOTAGE IN SURVEY

3437

Table 2
Acquisition and Processing Parameters
at the
Gunsite 720 / 631-16G

Date Data Acquired	1/27/93 and 3/25/1993
Instrument Type	GSSI (SIR 10) S/N 1158
Antenna Type	300 Mhz
Calibration Numbers	Supplied by GSSI PG-90-177 Version 2.05 Max 141 Min 20 Diff 121
Post Processing Software	GSSI (RADANIII)
Range	100 ns
Start Position	-5 ns
End Position	95 ns
Survey Wheel	129.25 ticks/foot
Scans/Foot	4
Samples/Scan	512
Transmit Pulse Rate	50 Khz
Vertical IIR Low Pass Filter	N=2 F=60
Vertical IIR High Pass Filter	N=2 F=7
Horizontal Low Pass Filter	TC=0
Scans/Meter	13.1234
Marks/Meter (on plot)	approximately 5 meters/mark

Figure 1



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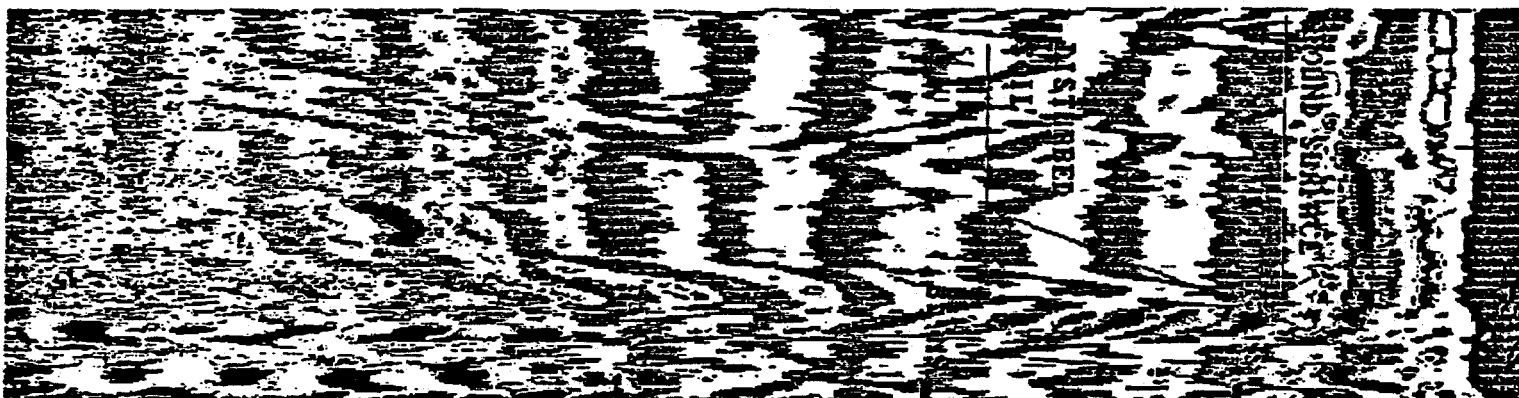
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Vert. IIR high pass N=2 F=7

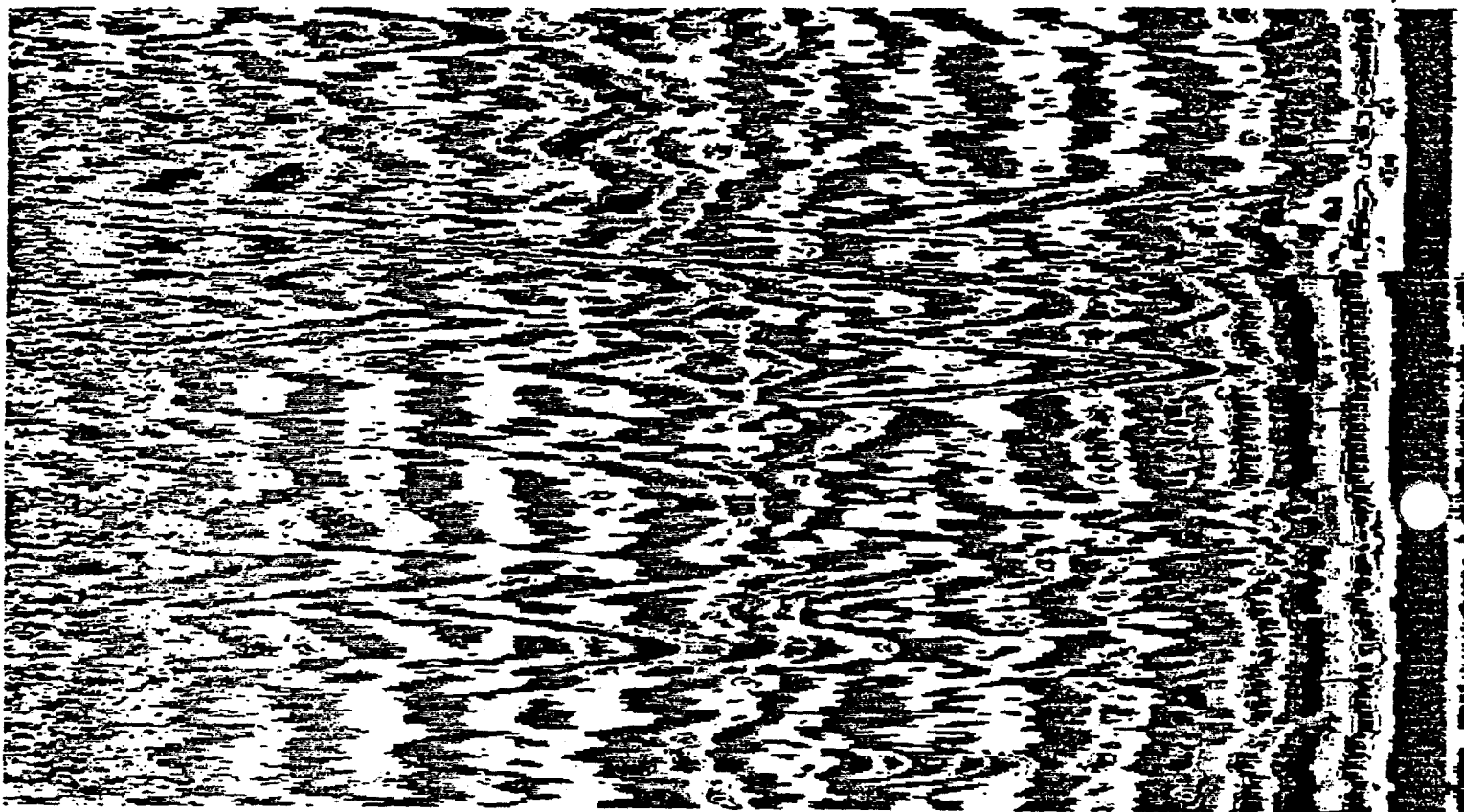
SAVANNAH RIVER SITE

F-AREA ACID CAUSTIC PIPELINE



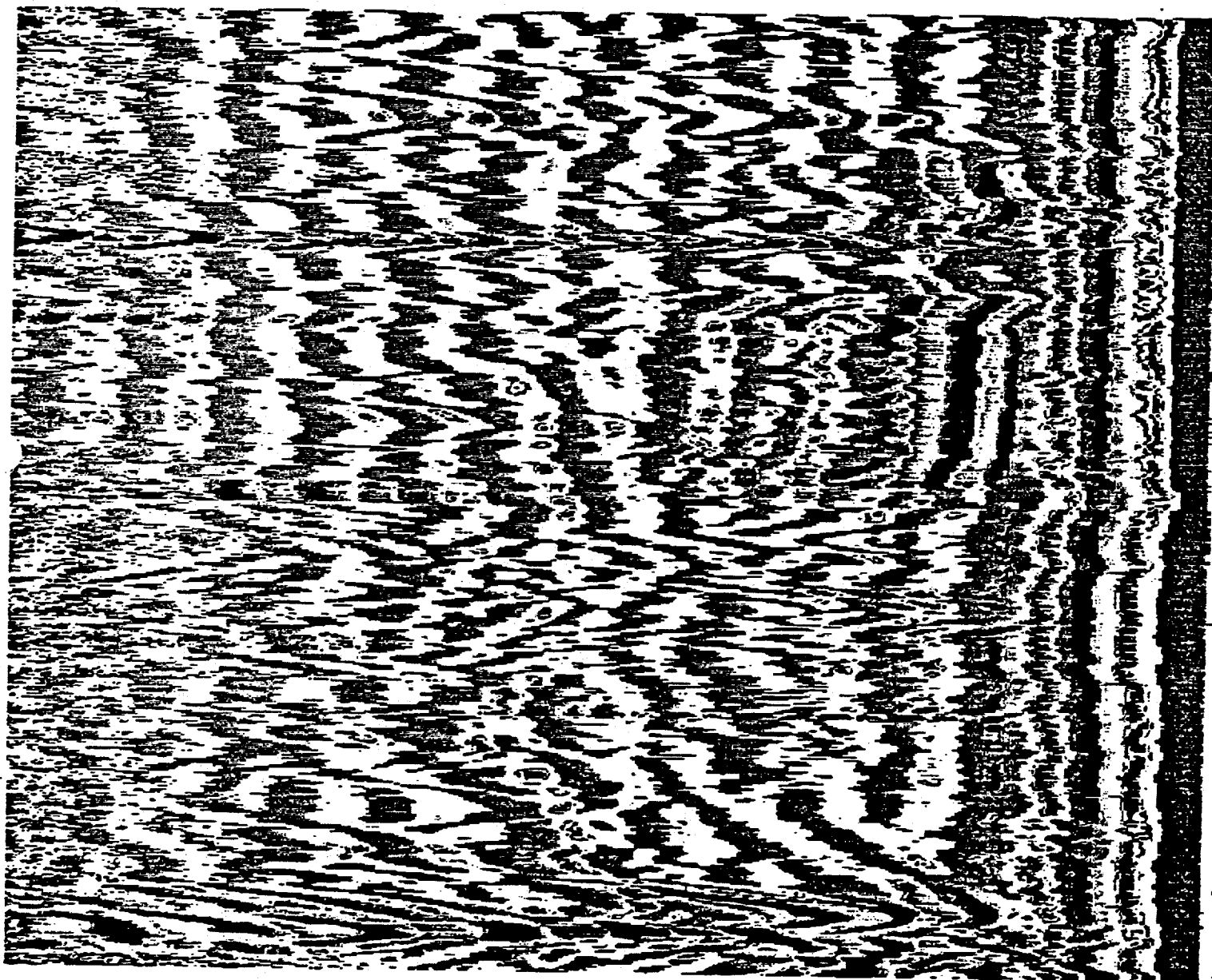
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GUNSITE 720 / 631-16G
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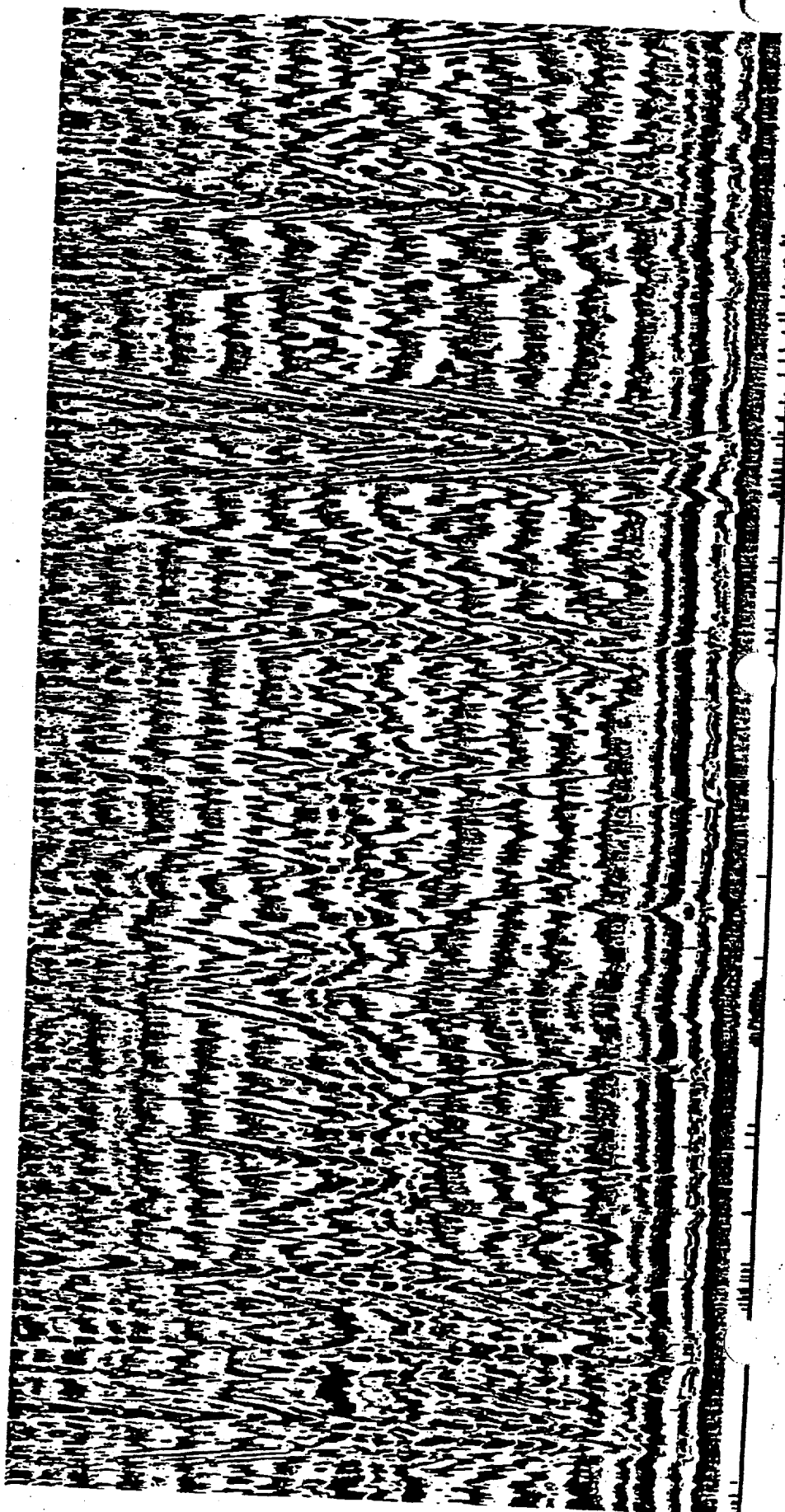
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SAVANNAH RIVER SITE



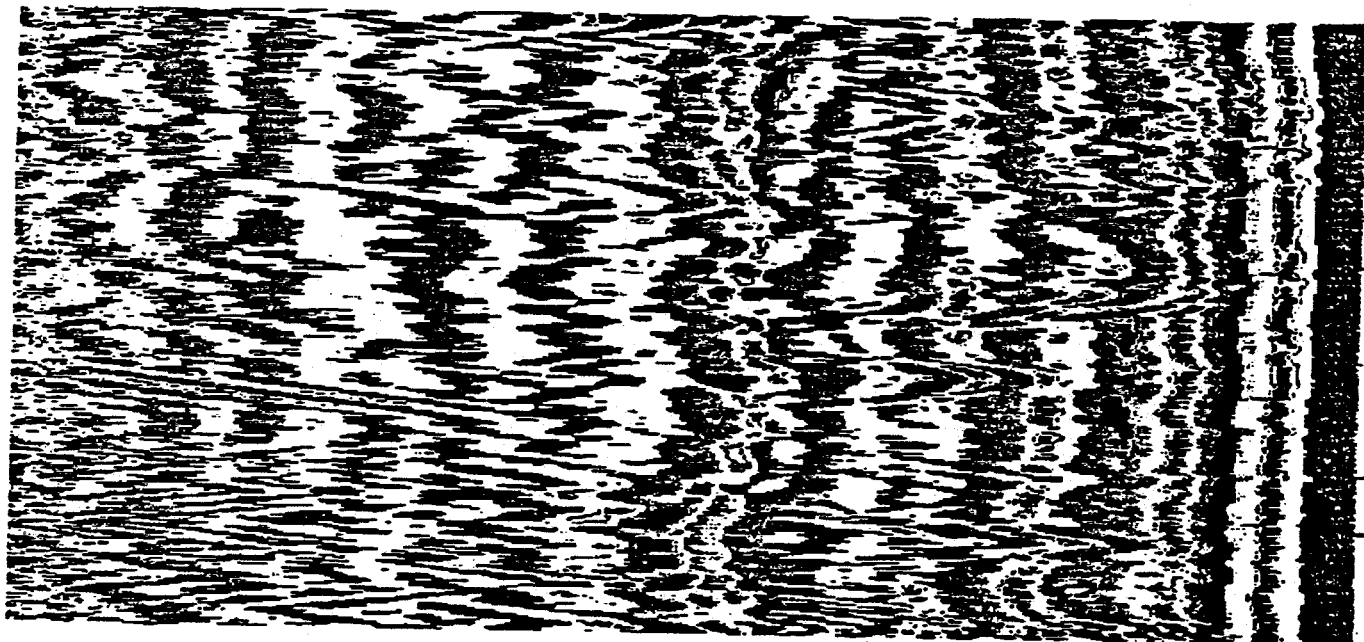
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Vert. IIR high pass N=2 F=7

GUNSITE 720 / 631-160
SAVANNAH RIVER SITE



4 Created Jan 26, 1993 12:20 Modified Date Unknown
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Vert. IIR low pass N=2 F=60
Vert. IIR high pass N=2 F=7

GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE



5 Created Jan 26, 1993 12:23 Modified Date Unknown
512 samples/scan 30.0019 scans/sec position: -5 nS range: 100 nS
Vert. IIR low pass N=2 F=60
Vert. IIR high pass N=2 F=7

GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE

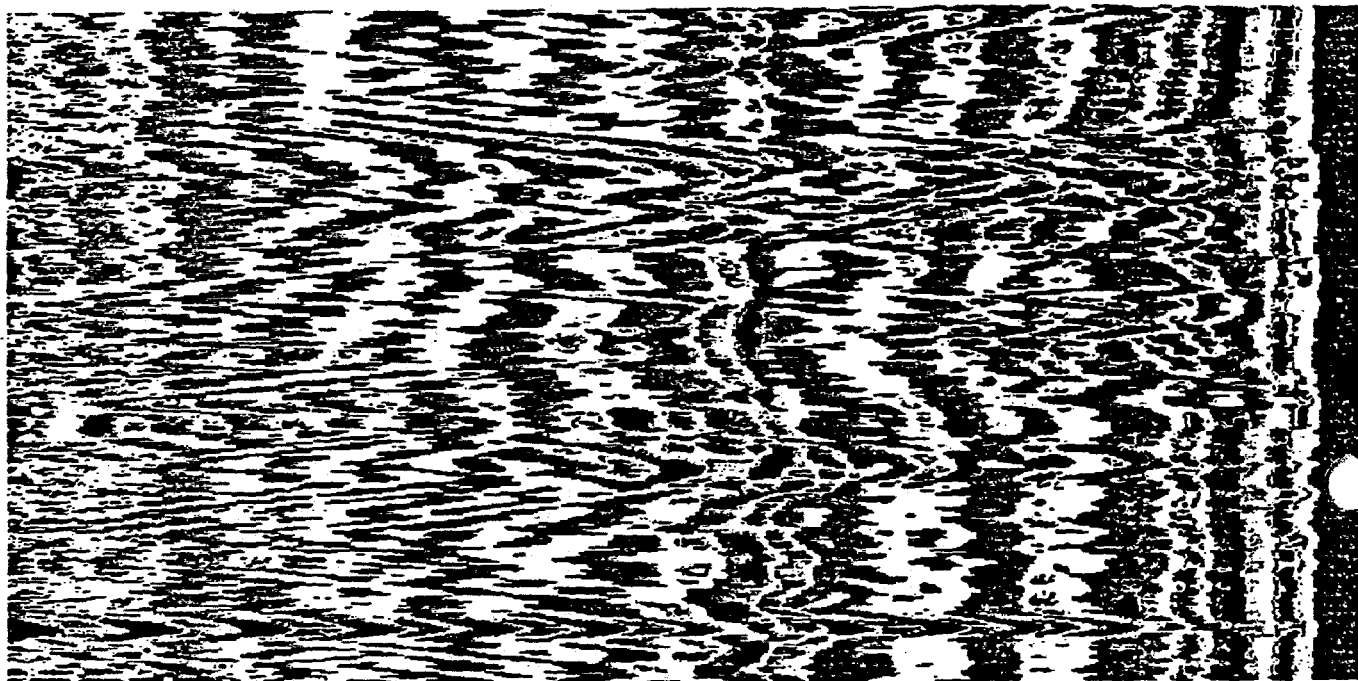
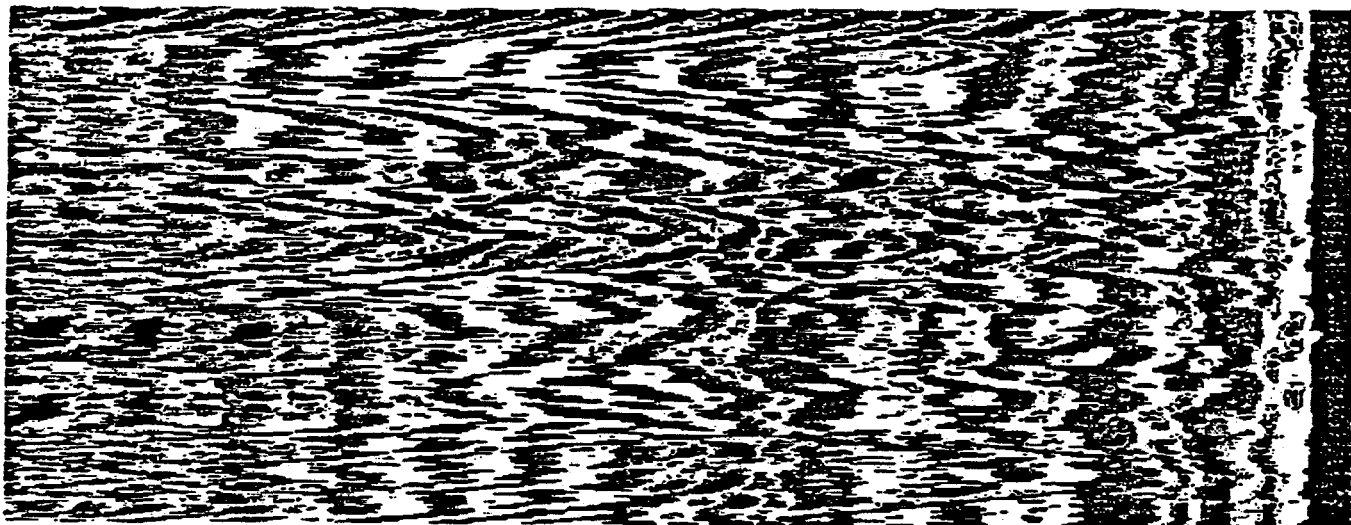


Figure 8

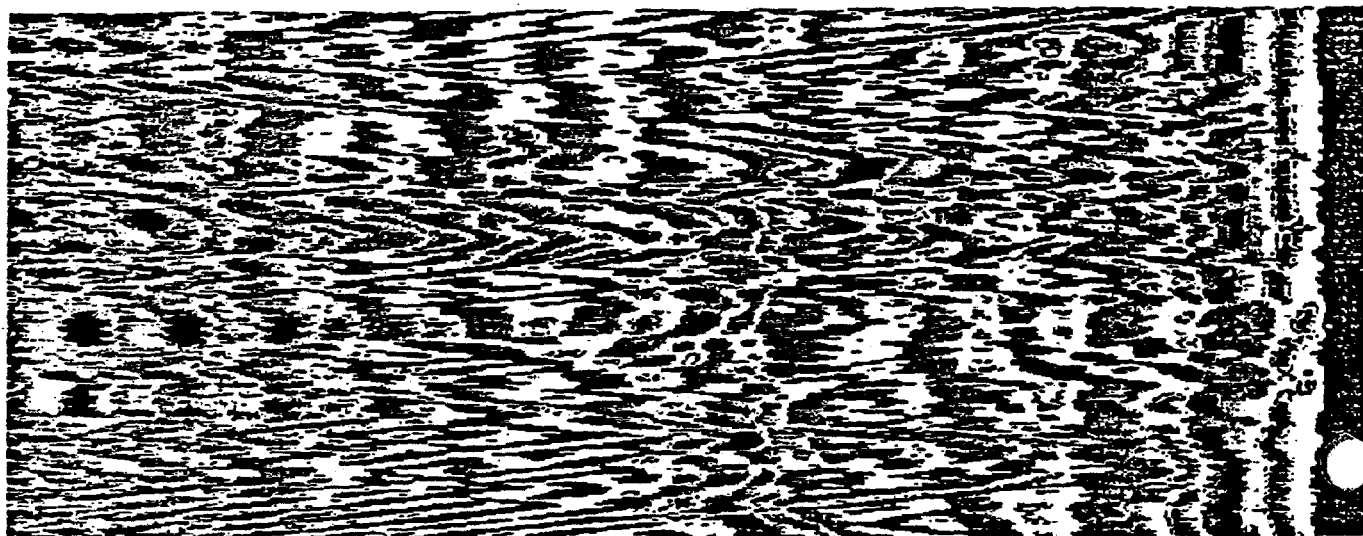
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GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE



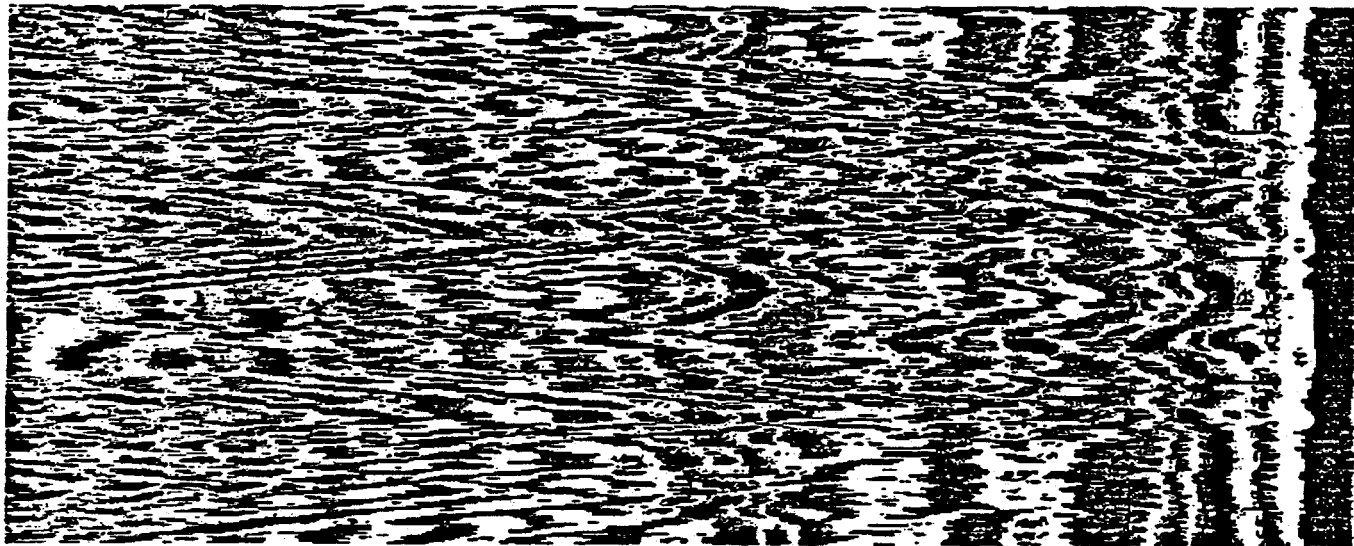
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GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE



8 Created Jan 26, 1993 12:33 Modified Date Unknown
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GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE



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GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE

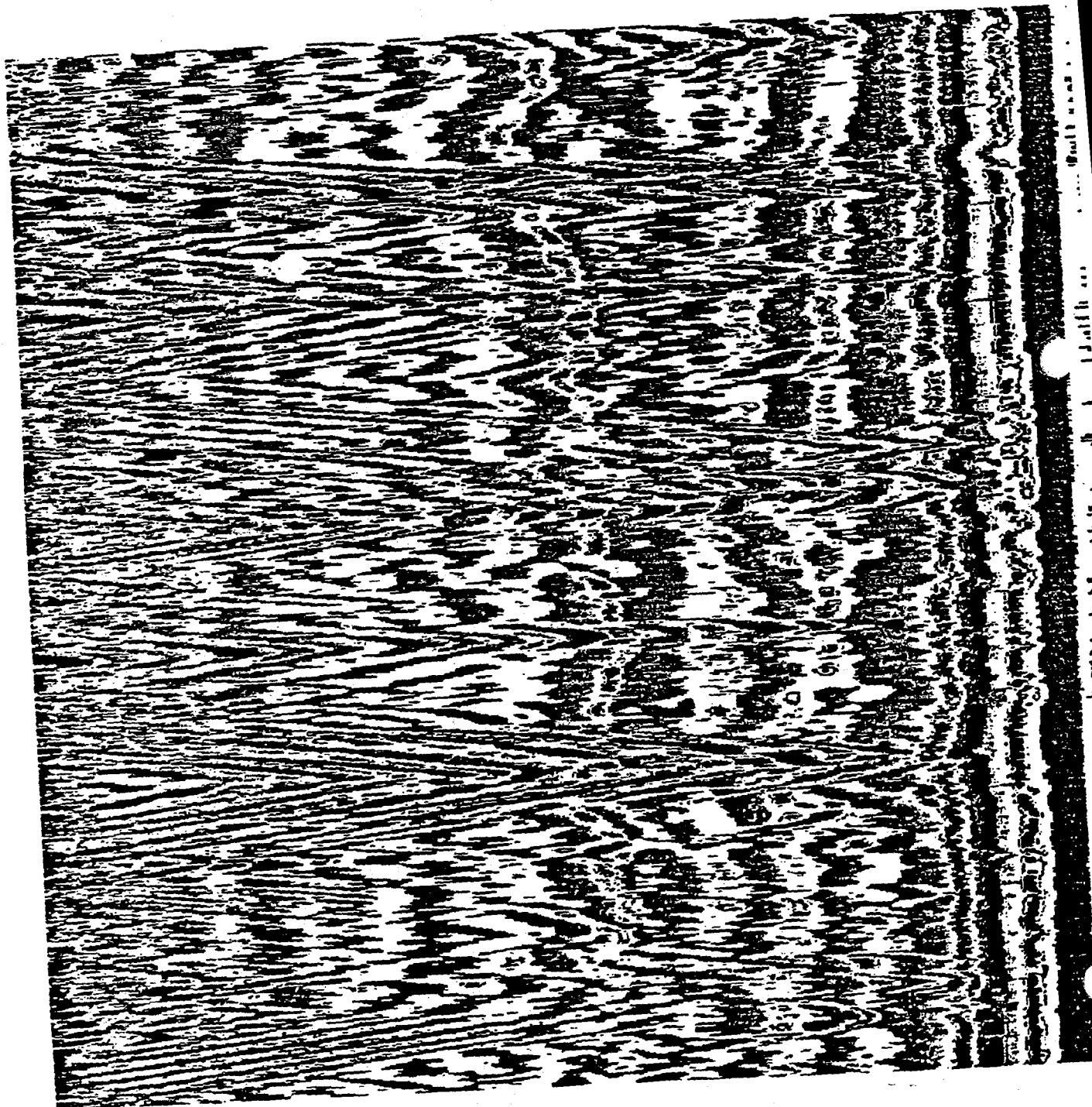
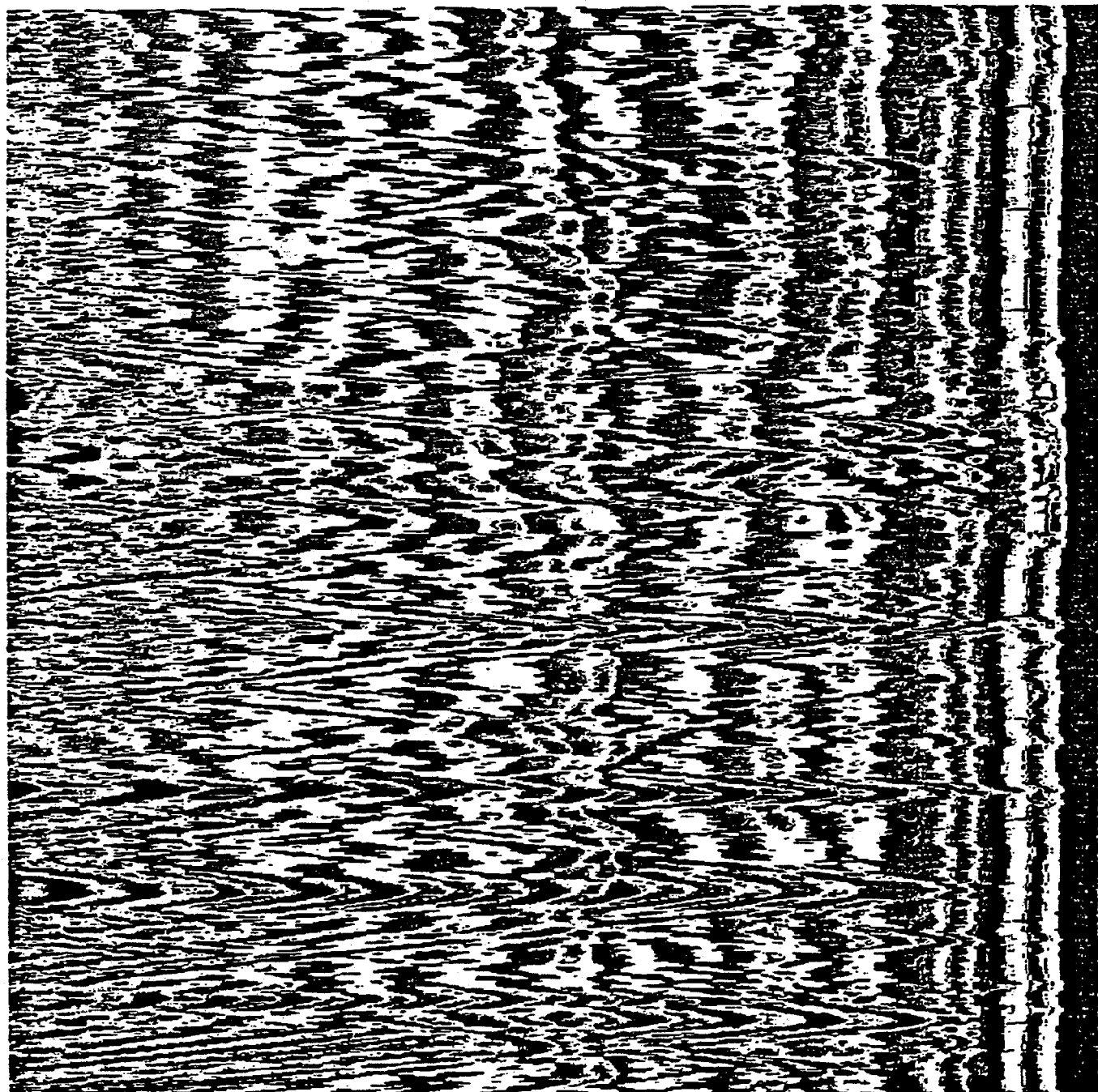


Figure 12

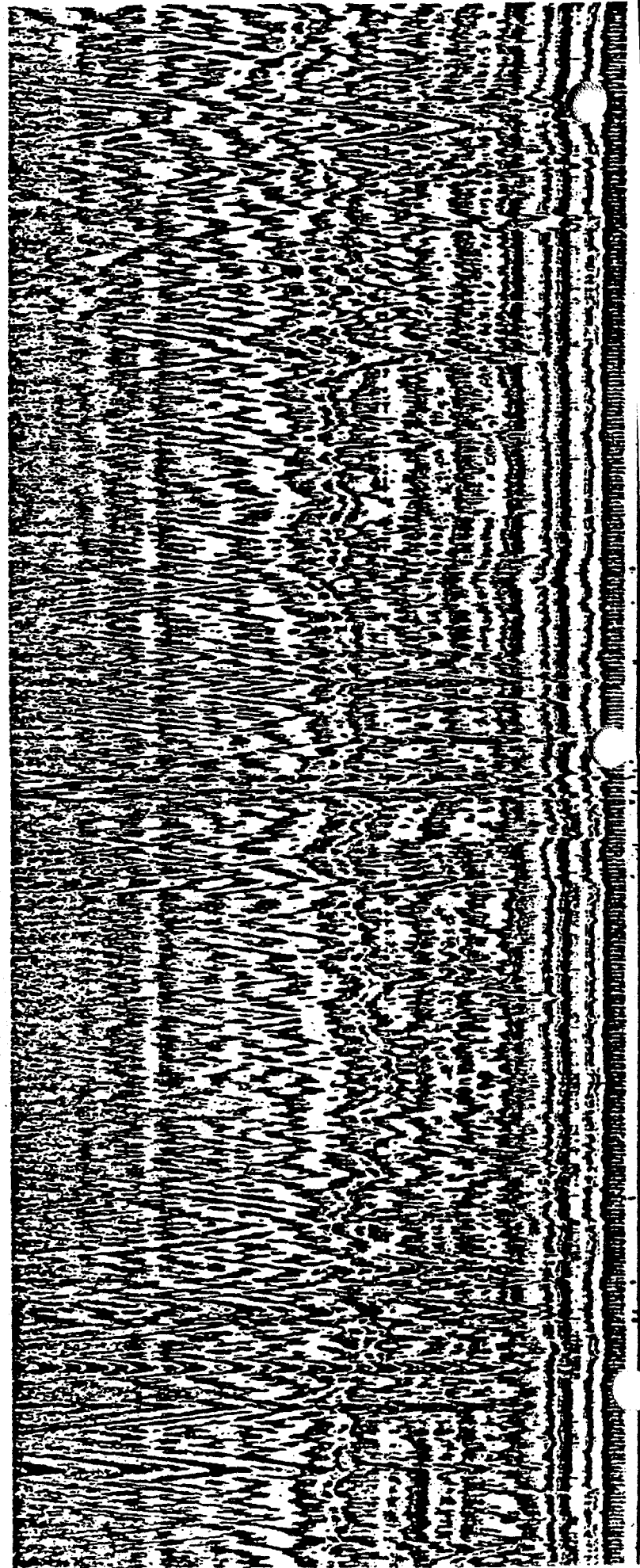
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GUNSITE 720 / 631-16G
SAVANNAH RIVER SITE



REF ID: A631-166

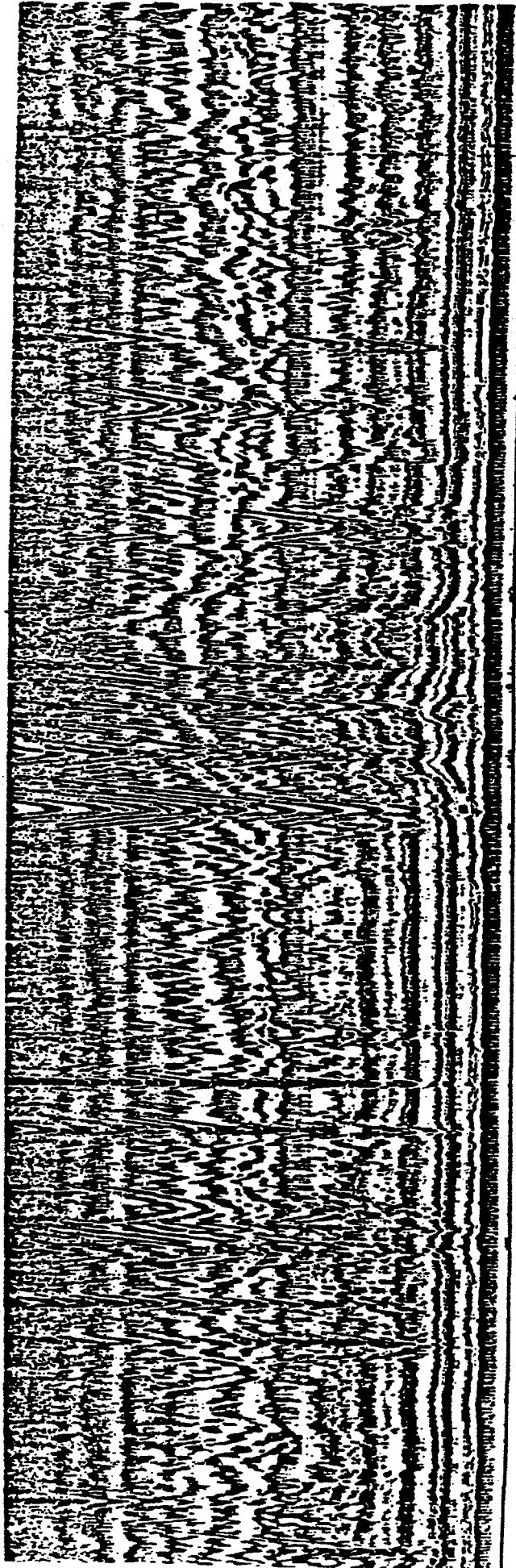
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Vert. 112 High Pass 501 P=7

Figure 24

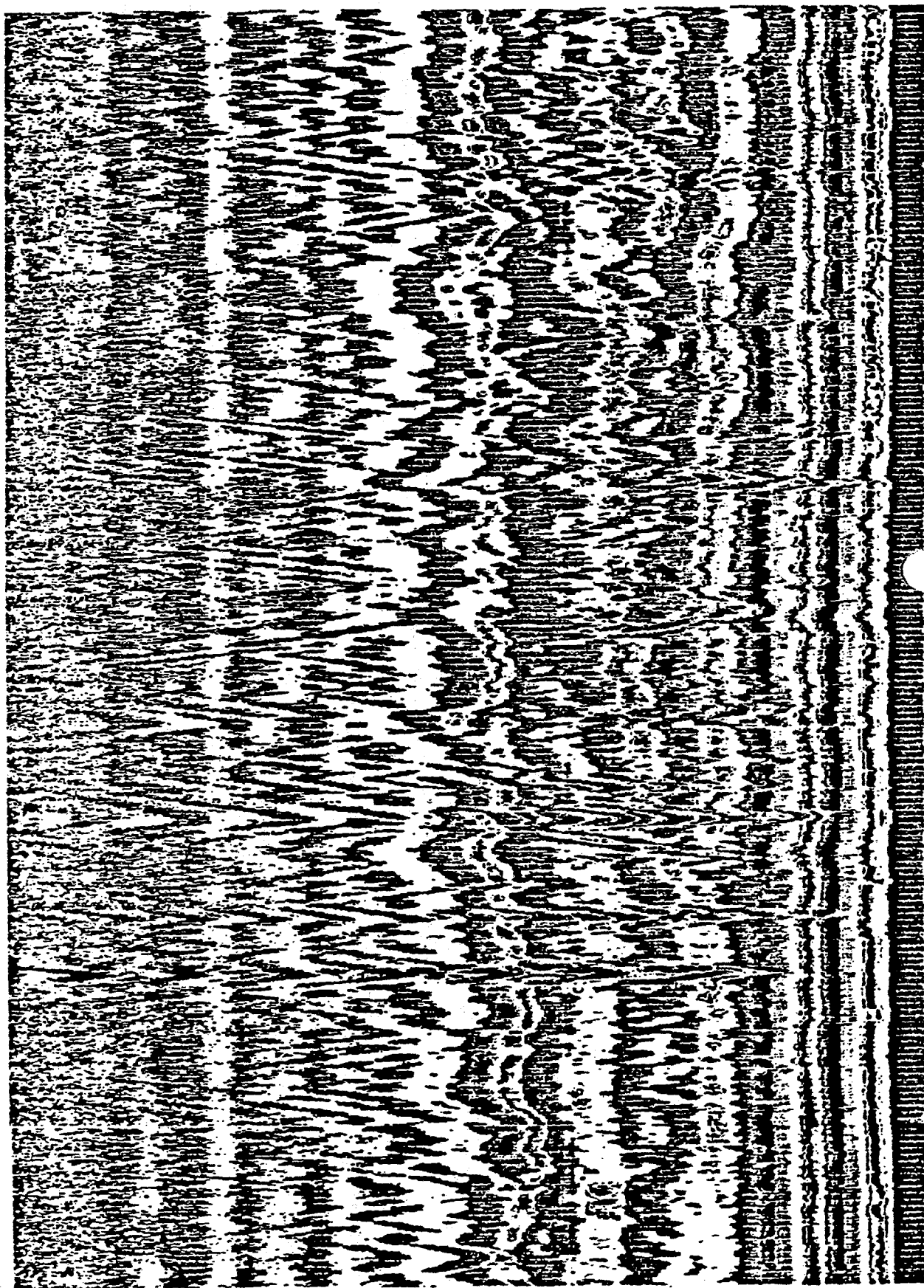
SEVERAL RIVER ECHO
GEMINIS 720/431-100



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Vert. IIR high pass N=2 F=7

Figure

SAVANNAH RIVER SITE
GUNSITE 720/631-16G



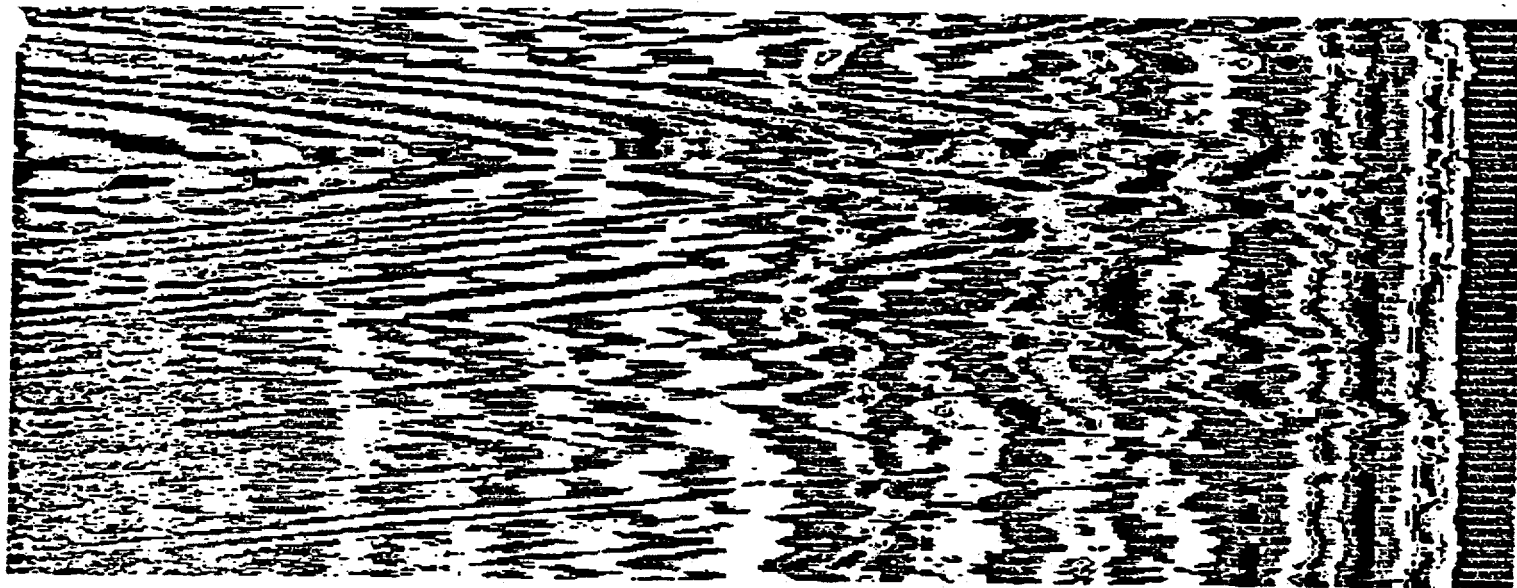
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position: 45 ns range: 100 ns

002872

Figure 16

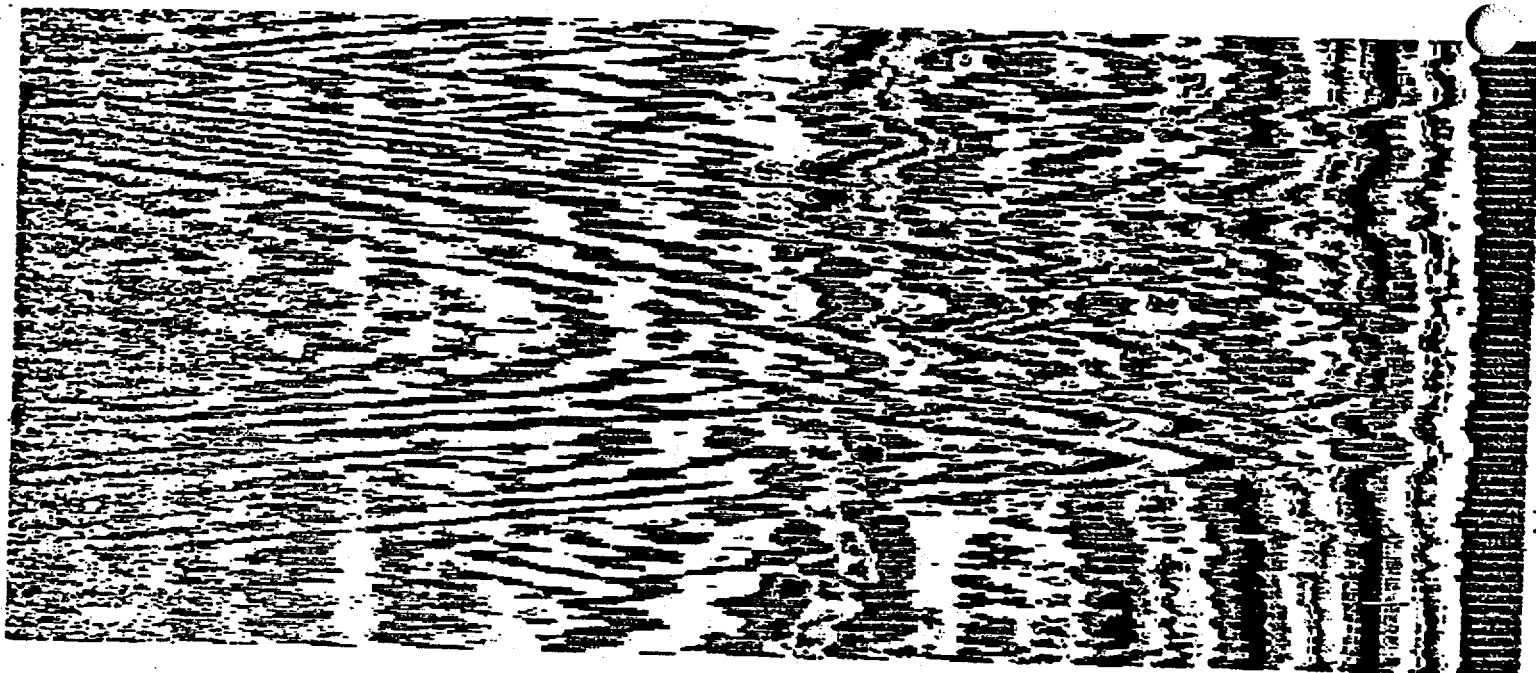
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



512 samples/scan 51.9922 scans/sec position: -5 nS range: 100 nS
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure

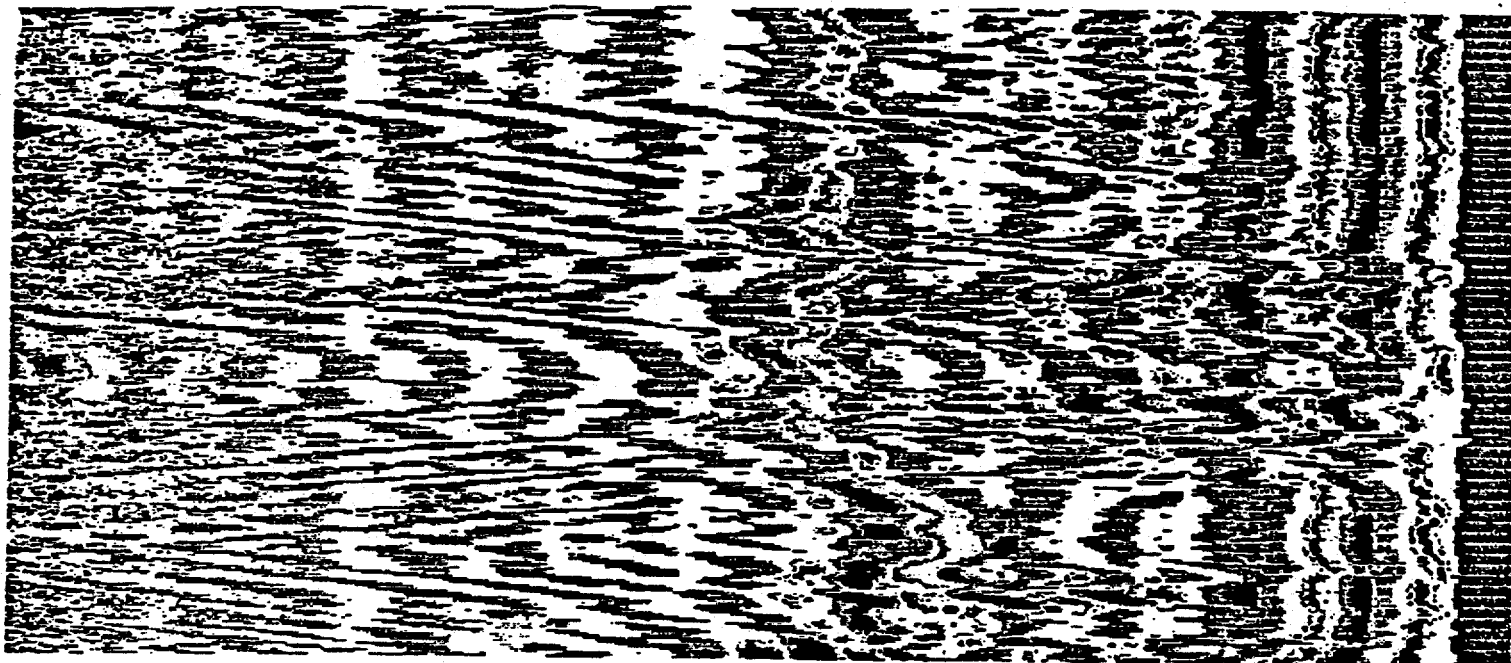
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



512 samples/scan 51.5522 scans/sec position: -5 ns range: 100 ns
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure

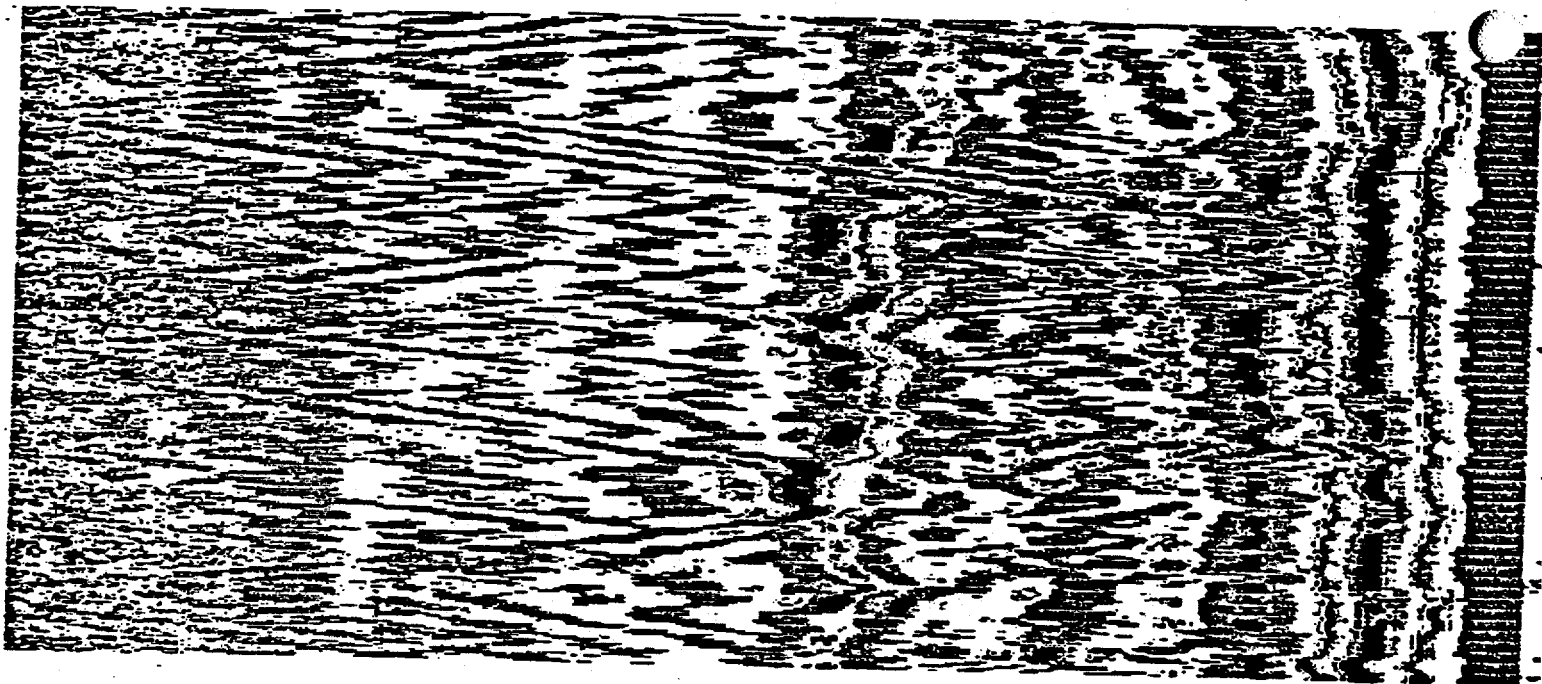
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



111 samples/scan 31.500 scans/sec position: -5 ns range: 100 ns
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure :

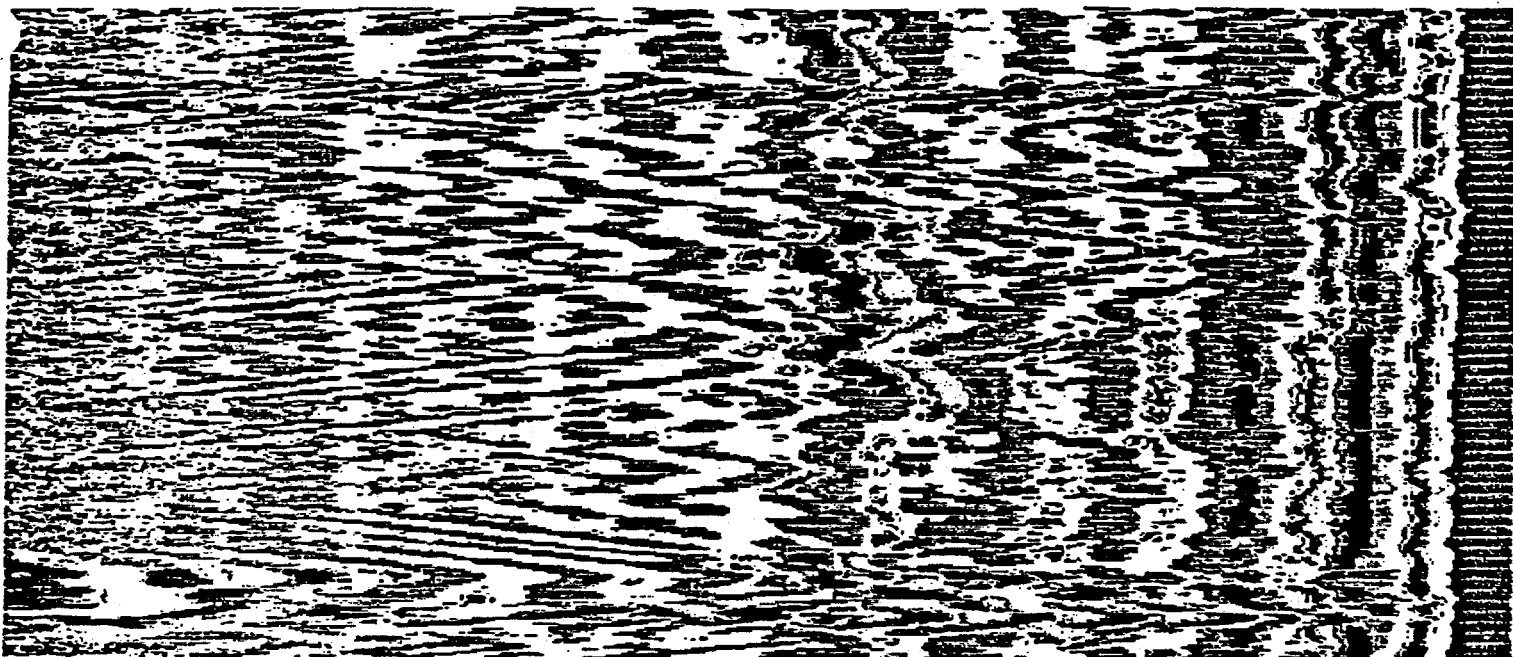
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



111 11111111, scan 11.9944 scans/sec position: -3 ns range: 100 ns
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure 20

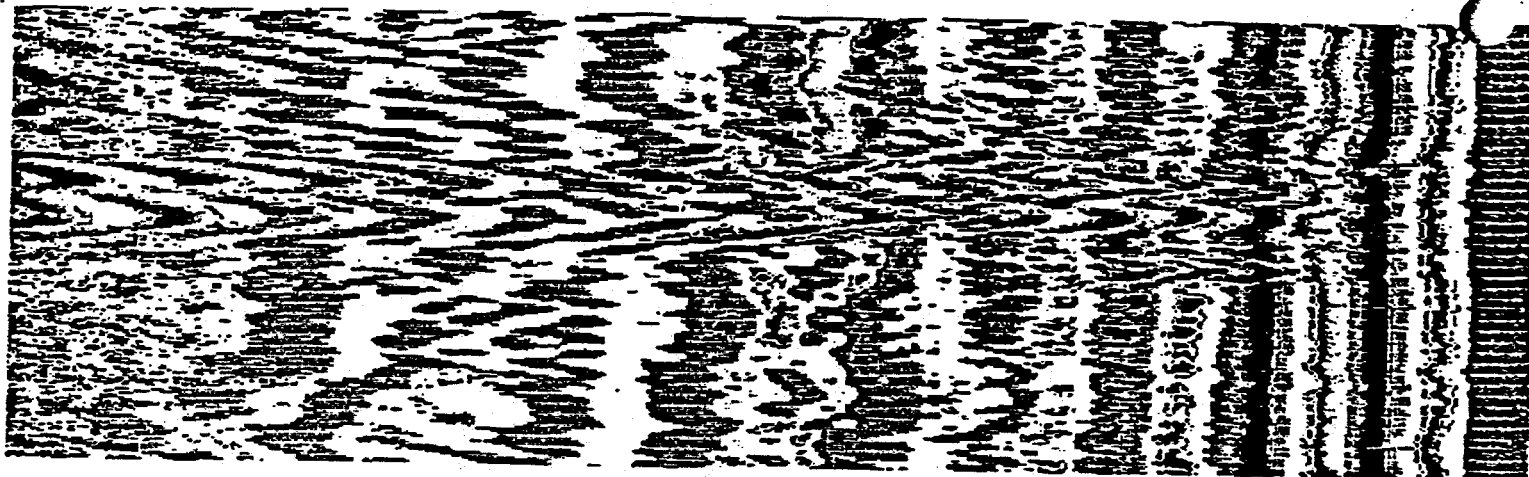
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



512 samples/scan 31.9922 scans/sec position: -5 nS range: 100 nS
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure

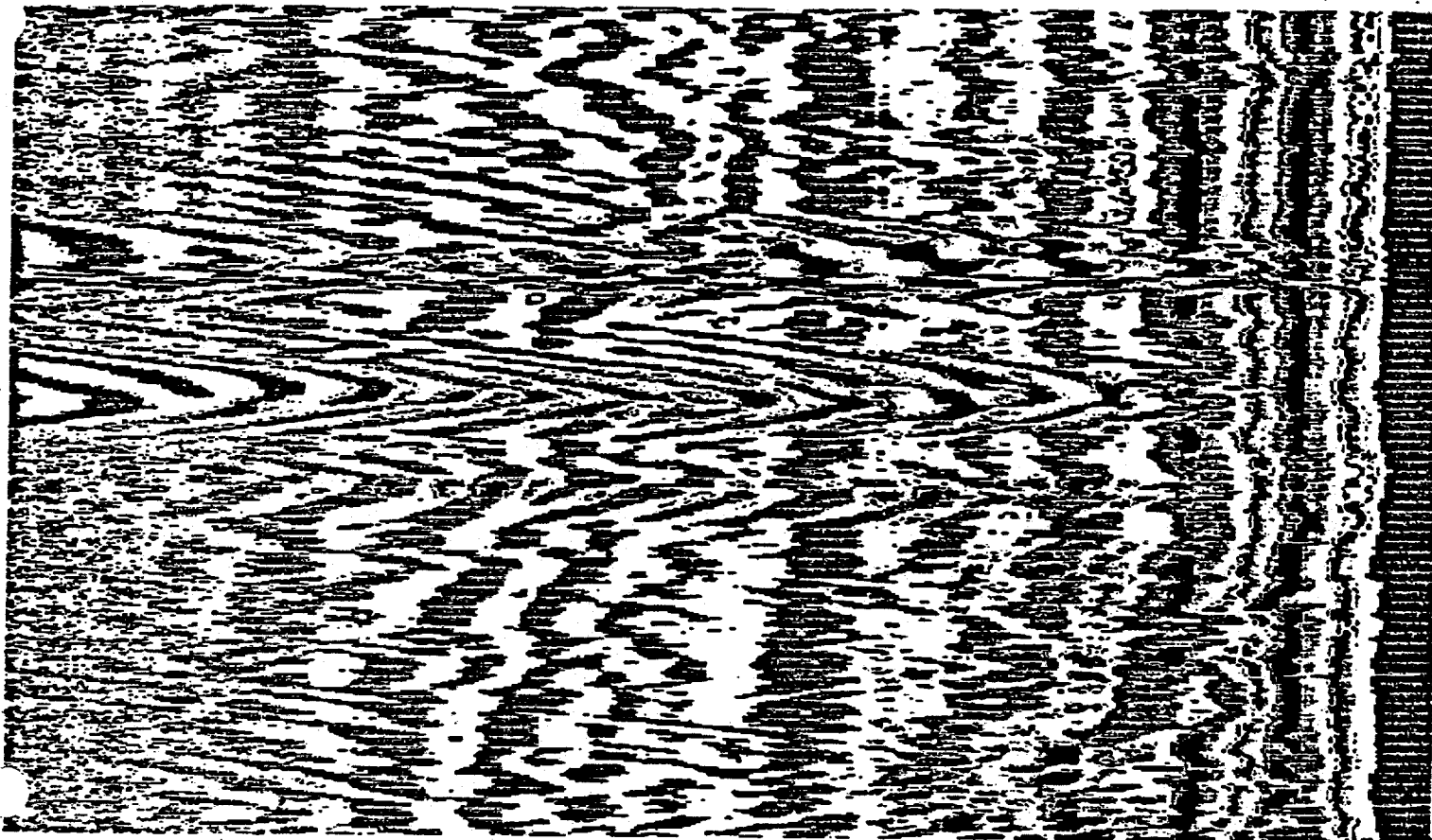
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



512 samples/scan 31.9922 scans/sec position: -5 ns range: 100 ns
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure :

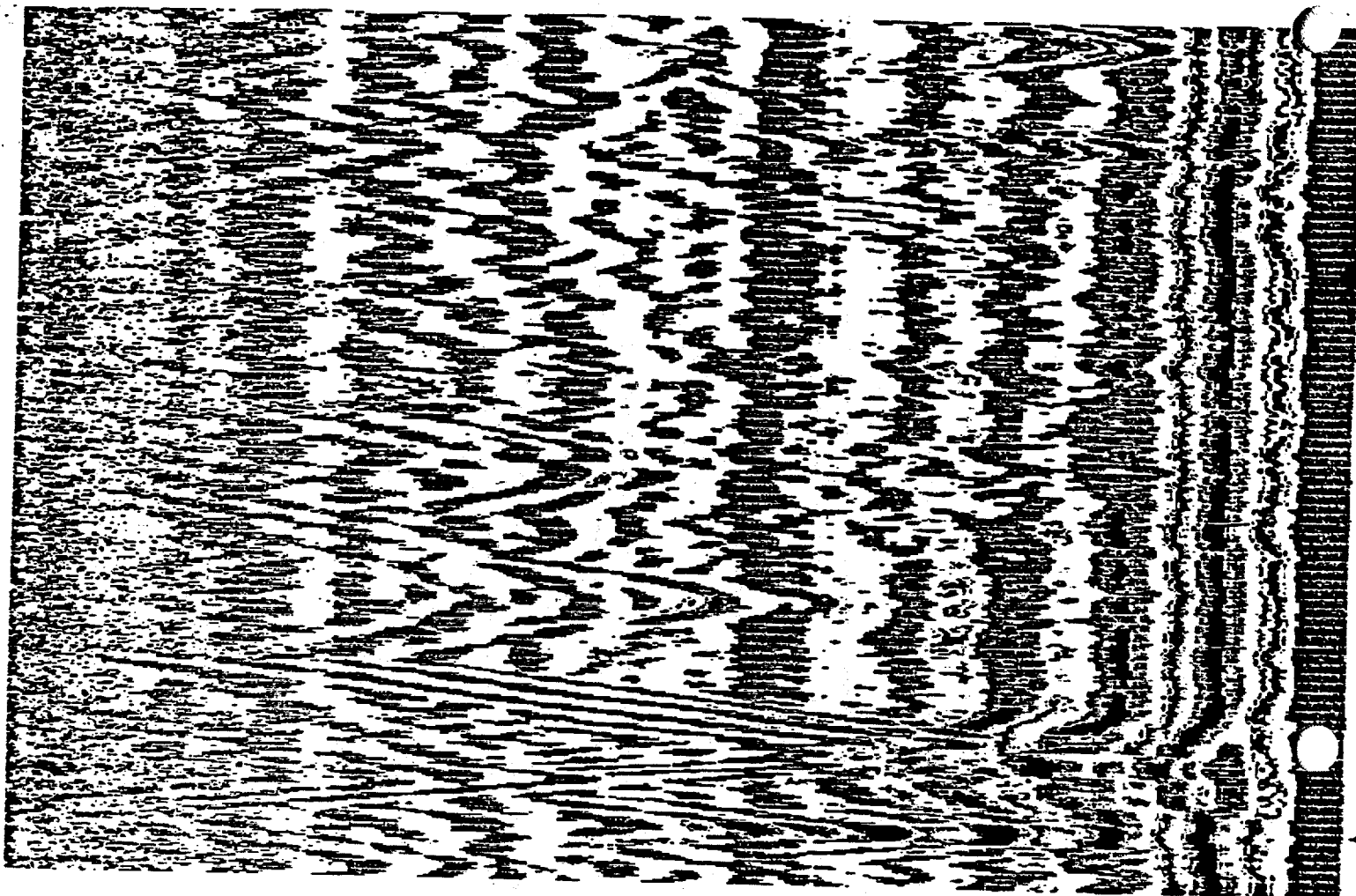
SAVANNAH RIVER SITE
GUNSITE 720/631-16G



512 samples/scan 31.9922 scans/sec position: -5 ns range: 100 ns
Vert. IIR low pass N=1 F=60
Vert. IIR high pass N=2 F=7

Figure

SAVANNAH RIVER SITE
GUNSITE 720/631-16G



... samples/sec 51.5544 scans/sec position: -5 ns range: 100 ns

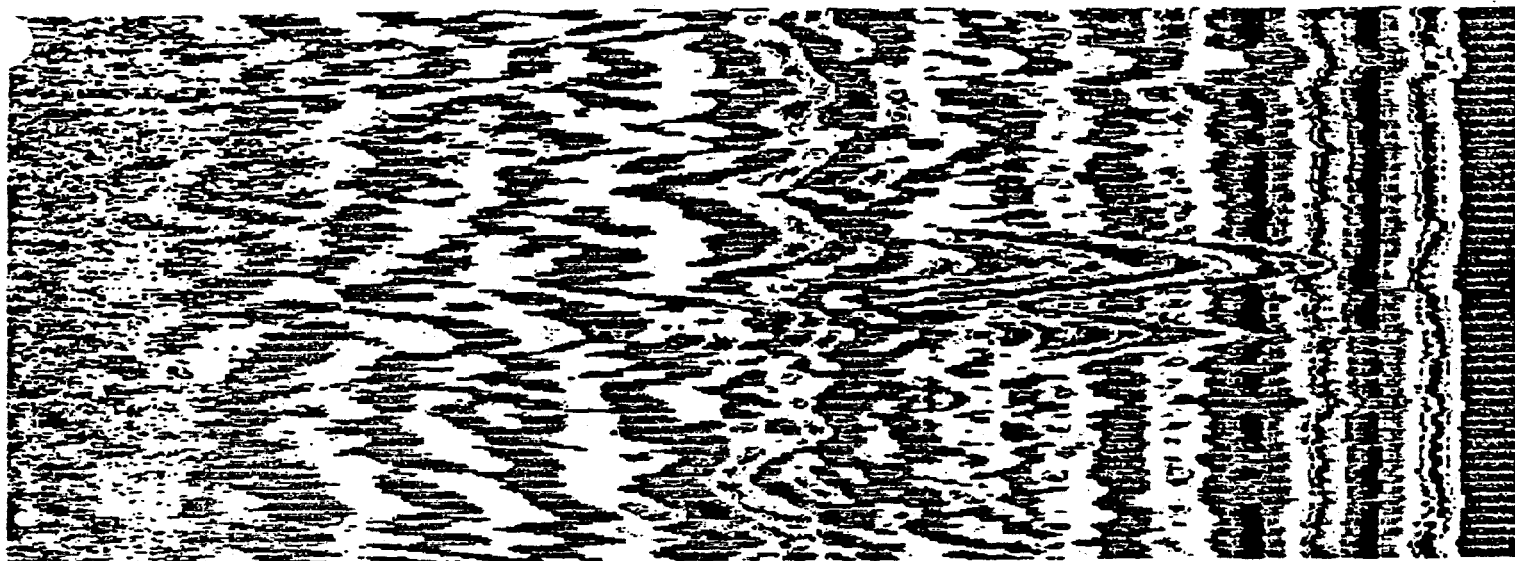
Figure 24

Vert. IIR low pass N=1 F=60

Vert. IIR high pass N=2 F=7

SAVANNAH RIVER SITE

GUNSITE 720/631-16G



**APPENDIX A.2
MAGNETIC SURVEY**

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Magnetic Survey of a Portion of Gunsite 720 Waste Site(U)

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Introduction and Scope

The Gunsite 720 Resource Conservation and Recovery Act (RCRA) Waste Unit is located on the Savannah River Site (SRS) off Brinkley Road northwest of the intersection of Upper Three Runs Creek and U. S. 125 (see Figure 1). A magnetic survey was conducted at this waste unit on March 21, 1986, by J. A. Smith and K. Mims to search for an underground storage tank. The data and results of this survey are described in a memorandum dated March 26, 1986, to Van Price of the Environmental Monitoring Section, Environmental Protection Department. The March 1986 survey revealed several magnetic anomalies, one of which was closely associated with a concrete pad located on the waste unit. In conjunction with this survey, a rod was used to probe around the northwest side of the pad. No buried object was located and further work was recommended on the south side of the pad.

On March 15, 1993, at the request of the Environmental Restoration Department, the Environmental Monitoring Section Groundwater Group conducted a magnetic survey. This survey consisted of several lines in the vicinity of the concrete pad in Smith's 1986 survey. During the 1993 survey, a reconnaissance line extending southeast of the concrete pad assisted personnel to locate a magnetic anomaly that had not been identified before. On May 17, 1993, the survey grid was expanded to characterize the unknown anomaly. This report describes the 1993 magnetic survey of the Gunsite 720 Waste Unit and integrates the results of Smith's 1986 survey.

Magnetic Survey Concepts

The magnitude of the magnetic field measured near the Earth's surface is influenced by several factors. The main contribution to the total intensity is the internal magnetic field of the Earth produced near the its core. However, this field is modified by the solar wind of charged particles produced by electromagnetic activity on the sun. This solar wind distorts the magnetic field produced by the Earth into a tear drop shape with the blunt end pointing toward the sun. More importantly, the effect of the solar wind is to produce time variations in the total field. The Earth's rotation, in effect, introduces a diurnal variation with a 24-hour period. Also, superposed on this well-defined 24-hour cycle

are variations with an undefined period produced by the chaotic nature of the sun's electromagnetic activity. Typically, these variations manifest themselves as micropulsations less than 10 nT, but significantly larger variations can be produced by magnetic storms on the sun (i.e., sunspots). The net result of these variations are illustrated in Figure 2.

The Earth's magnetic field also is modified by features near the surface that produce localized, spatial variations or anomalies in the field intensity. Using magnetic techniques to search for buried metallic objects is a consequence of the ability of iron and iron alloys to cause relatively large amplitude anomalies. These anomalies are produced by two effects. Some materials have properties that allow them to become magnetized in the presence of an external magnetic field. This process is called induction. The external magnetic field is the inducing field, and the field produced by the material is the induced field, so that the total field, B now becomes the sum of the inducing external field $\vec{H}$ and the field produced by the material $\vec{H}'$. This relationship can be expressed:

$$\vec{B} = \vec{H} + \vec{H}'$$

In addition, some materials possess a magnetic field independent from any external source. This field typically is acquired at some time in the past history of the material and is called remnant magnetization. For most magnetic survey applications, the magnitude of the induced field is assumed to be much greater than the remnant magnetization.

In reality, magnetic fields always are manifested as dipoles, that is, north and south magnetic poles occur in pairs to produce dipole fields. A field line representation of a dipole field and a monopole field are illustrated in Figure 3. In this type of representation, the density of the field lines is proportional to the field magnitude. Initially, the magnetic field produced near the core of the Earth can be considered a single dipole, with the magnetic field lines impinging the Earth's surface at 90 degrees at the north and south magnetic poles and parallel to the Earth's surface at the magnetic equators.

The geometric relationship of the magnetic field lines to the geographic poles is expressed by magnetic inclination and declination. Declination describes the angular relationship between a component in the field line parallel to the surface on the Earth and the geographic north. The magnetic inclination expresses the angular relationship between the magnetic field lines and the horizontal (see Figure 4). Although these angular relationships change slowly because of poorly understood, long-term variations, the declination in the vicinity of SRS is about 4 degrees west, and the inclination about 65 degrees north.

Although inducing bodies usually possess highly irregular shapes and sizes, they can be modeled usefully as dipoles or arrays of dipoles. In some instances, if the area of consideration is near one end of a dipole relative to the dipole separation, the local field can be considered to be produced by a single pole and approximates monopole behavior. The anomalous fields produced by a dipole and monopole for a magnetic inclination of 60 degrees in the northern hemisphere (i.e., conditions very similar to SRS) and the resultant effects on the total magnetic field measured near the body are illustrated in Figure 3. Notice that the anomalous field lines on the north side of the dipole are opposite of the ambient field, thereby reducing the field strength in this location. In contrast, the anomalous field lines on the south side increase the field strength. The monopole exhibits similar behavior although not as extreme. This phenomena explains the asymmetrical-shaped magnetic highs and lows produced by inducing bodies at mid-latitudes on the Earth. Figure 5 illustrates typical magnetic profiles that would be observed at the latitude of SRS over monopoles and dipoles in addition to a generalized contour representation of a dipole, with illustrative profiles across the contours.

Generalized magnetic field intensity profiles for an inclination of 60 degrees are illustrated in Figure 6. These profiles exhibit the typical asymmetrical signatures along the north-south profiles with magnetic highs occurring over southern portions of the bodies. The profiles for the horizontal and vertical cylinders would be similar to that exhibited by a buried cylindrical fuel tank. The presence of concrete pads on the waste unit make the profiles for the horizontal slab instructive because these pads contain steel reinforcement bars and will exhibit significant magnetic anomalies.

The previous discussion was based on the intensity of the total magnetic field. Another measurement that can be useful in interpreting magnetic anomalies is the vertical magnetic gradient, which changes much more rapidly with distance than the total field. Using the vertical magnetic gradient results in edge enhancement of anomalies and more effective anomaly separation (see Figure 7). The vertical magnetic gradient can be determined by making measurements of the total magnetic intensity at two known elevations. The vertical gradient is then determined by the difference between the two measurements divided by their separation. These measurements can be taken by sensors. This is done by moving a sensor between the two measurements or having an instrument with two separated sensors.

In order to conduct a magnetic survey, magnetic data are collected at discrete intervals either along a traverse or over a two-dimensional (2-D) grid. In practice, data for 2-D grids usually are collected as multiple traverses. Traverse data can be displayed conveniently as magnetic intensity profiles, while 2-D gridded data usually are contoured and displayed as contour diagrams. Displayed in this fashion, these data can be interpreted qualitatively by comparing them with profiles or contours that would be predicted from bodies of known shape and size as presented earlier.

Description of Survey Site

A planimetric map of Gunsite 720 Waste Unit is presented in Figure 8. The reference for this map is the Planimetric Map of Gunsite 720 prepared by Cranston, Robertson, and Whitehurst, P. C., 1990. An unimproved dirt road that runs southeast-northwest along the northeast side of the waste unit is the boundary. The most prominent objects at the waste site are two concrete pads, the smaller of which serves as a foundation for a small shed. The vicinity around the smaller pad has been the focus of the magnetic surveys conducted so far. In addition to these pads, several iron rails are located west of the larger concrete pad. These rails are located a few meters south of the 1993 survey grid but do not extend into the grid. This planimetric map also shows a flagged trench. This feature is included on Figure 8, but the trench was not recognized during the survey.

1986 Magnetic Survey

The magnetic survey data reported by Smith are tabulated in Appendix I. Based on Smith's diagram of the pad location and size, the locations of the survey stations in Appendix I have been converted into the coordinate system established for the 1993 magnetic survey. The positions of the 1986 survey stations relative to the 1993 survey coordinate system are illustrated in Figure 9.

The 1986 magnetic survey reveals three distinct magnetic anomalies (Figures 10a and 10b). The largest anomaly occurs in the vicinity of the small pad and exhibits dipole behavior, which is defined by a 700 nT magnetic high, located southwest of the pad's southwestern edge, and a 100 nT magnetic low, located northwest of the pad. A smaller magnetic high of 80 nT that approximates monopole behavior occurs nine meters northwest of the pad at coordinates (-10,12). In addition to these two features, a 400 nT magnetic high occurs in the northwestern corner of the grid near the road. Smith attributed this feature to a truck parked nearby at the time of his survey.

The results of Smith's survey were inconclusive. The magnetic anomaly associated with the pad exhibited a magnetic high offset to the southwest of the pad instead of directly over the southwestern edge. This would be expected if the pad were the sole source of the anomaly.

1993 Magnetic Survey

Survey and Analytical Techniques

The 1993 magnetic survey conducted by the Environmental Monitoring Section Groundwater Group was conducted in two parts. All grids and lines surveyed in 1993 were defined by one meter station intervals. Prior to collecting the magnetic data, the station locations were positioned using a transit to establish 90 degree angles and straight lines and a cord marked at one meter intervals.

Magnetic data were collected with an EG&G Geometrics G-856 Gradiometer. The top sensor

was 2.44 meters from ground level and the bottom sensor 1.22 meters from ground level. This instrument has a nominal accuracy of 0.1 nT; however, the high magnetic gradients produced near the concrete pad and other metal objects caused the accuracy to deteriorate to 1 nT in these areas. As a quality assurance/quality control (QA/QC) check, and in order to account for diurnal variation, a single station was occupied several times during each survey.

The data were downloaded from the magnetometer through a RS-232 port to an IBM PC Model 80. After downloading, the data were assigned coordinates and diurnally corrected with MAGLOC, a software provided by EG&G. Further data display and processing, including gridding and contouring, were accomplished with software provided by GEOSOFI Inc. Gridding data was accomplished with RANGRID, which fits a minimal curvature surface to the gridded data. Magnetic gradients were calculated by subtracting the top sensor reading from the bottom sensor reading and dividing by their separation.

Section I was surveyed on March 15, 1993. The station locations for this survey are illustrated in Figure 11. Section I consists of a 6 x 21 grid approximately centered on the small pad that extends in long dimension to the northeast and southwest of the pad. This survey also included two reconnaissance lines (710 and 810) that extend perpendicular to the long axis of the grid (Figure 11). During the survey, station (5,0) was occupied several times in order to establish the diurnal variation. The data for this survey are presented in Appendix IIa.

Section II was surveyed on May 17, 1993. The station locations for Section II are illustrated in Figure 12. During the survey, the station coordinate (4,7) was occupied several times in order to establish the diurnal variation. The data for Section II are presented in Appendix IIb.

In order to make the two surveys compatible, stations coordinates (4,7) through (4,18) and coordinate (5,7) through (5,18) were common to both Section I and Section II. The surveys were combined by taking the average of the diurnally corrected values for each survey and assigning the average value to these stations.

1993 Magnetic Data Set

The magnetic gradients for the two reconnaissance lines (710 and 810) are plotted as profiles in Figure 13. Line 710 shows a large negative gradient anomaly near the small pad, but exhibits no gradient anomalies over the rest of its length. Note that the 80 nT magnetic high seen at coordinate (-10,12) in the 1986 data is not seen on line 710. Line 810 exhibits a large positive gradient anomaly near the small concrete pad and another smaller anomaly approximately 8 meters southeast of the pad. This anomaly was the subject of the survey conducted in Section II.

The station locations for the combined Section I and Section II data set are shown in Figure 14 and the data tabulated in Appendix IIc. Several magnetic anomalies are present in the data (see Figures 15-17). A dipole anomaly is defined by a magnetic high that occurs directly over the southern corner of the small pad and a magnetic low associated with the northern corner of the pad, with a monotonically decreasing field between these two areas. Note that the zero vertical gradient contour diagonally bisects the concrete pad, and there is no east-west horizontal gradient over the center of the pad.

The anomaly seen on reconnaissance line 810 to the southeast of the pad approximates a circular monopole centered at coordinate (14,12). An elongate magnetic high also occurs in the southern corner of the grid at coordinate (20,9). As shown on the plan maps, this corner is very near the location of several iron rails.

Discussion

The most prominent feature seen on the 1986 and 1993 magnetic surveys is the dipole anomaly located in the vicinity of the small concrete pad. However, the character of the anomaly shows significant differences in the two surveys. The magnetic high in the 1993 data coincides with the southern corner of the pad, and a corresponding low is present just north of the pad with the field monotonically decreasing between these two areas. This is the expected behavior for a flat slab at this latitude. The same anomaly in the 1986 data has generally the same shape in

both surveys, however, it appears to be rotated 90 degrees and the magnetic high is not coincident with the southern corner of the pad. This discrepancy is unexplained; however, the 1993 data were collected at a much smaller grid spacing and is considered to more accurately represent the character of the pad anomaly. Based on the 1993 data, the shape and magnitude of the anomaly is consistent with that which is produced by a concrete slab reinforced with steel bar.

The monopole magnetic high located at coordinate (-10,12) in the 1986 survey is not present on line 710. This is apparently due to the fact that a large concrete object with metal pipes and bars was excavated and removed from this location in the time interval between the two surveys.

The monopole anomaly, which was noticed on the surface of this location during conduct of the survey, is located at coordinate (14,12) in the 1993 survey and is probably due to a metal cable anchor. Smith attributed this magnetic high, seen in the northeast corner of the 1986 survey, to a truck parked on the road, which was not present in the 1993 survey, thereby indicating that Smith's interpretation for the source of this anomaly is correct. The elongate magnetic high, seen in the southern corner of the 1993 magnetic survey, occurs near the location of several iron rails on the surface near the grid in this area. This anomaly is attributed to the presence of these rails.

Conclusions

A detailed magnetic survey in the vicinity of a small concrete pad at the Gunsite 720 Waste Unit has allowed much better resolution of the magnetic anomaly associated with the pad. This anomaly is only produced by the pad. The possible presence of a buried metal tank around the pad is unsupported based on the magnetic data. All other anomalies identified in the 1986 and 1993 magnetic surveys can be attributed to metal objects that were either excavated between the two surveys, or that can be identified on the ground surface.

References

1. Breiner, S. *Applications Manual for Potable Magnetometers*, Sunnyvale, California 94084 (1973).
2. Telford, W. M., Geldart, L. P., Sheriff, R. E. Keys, D. A.. *Applied Geophysics*. p. 860, Cambridge University Press, Boston, MA (1978).

Magnetic Survey of a Portion of Gunsite 720 Waste Unit

Appendix I: 1986 Magnetic Survey Data

{Coordinates (Coord) relative to 1993 survey grid}

<u>X</u> <u>Coord.</u>	<u>Y</u> <u>Coord.</u>	<u>Field</u> <u>(nT)</u>	<u>Y</u> <u>Coord.</u>	<u>Y</u> <u>Coord.</u>	<u>Field</u> <u>(nT)</u>	<u>X</u> <u>Coord.</u>	<u>Y</u> <u>Coord.</u>	<u>Field</u> <u>(nT)</u>
6.53	24.72	51798	-5.67	15.57	52408	-17.87	6.42	52427
6.53	21.67	52421	-5.67	12.52	52354	-17.87	3.37	52430
6.53	18.62	52393	-5.67	9.47	52486	-17.87	0.32	52430
6.53	15.57	52372	-5.67	6.42	52424	-17.87	-2.73	52452
6.53	12.52	52371	-5.67	3.37	52428	-20.92	24.72	52440
6.53	9.47	52466	-5.67	0.32	52436	-20.92	21.67	52471
6.53	6.42	52438	-5.67	-2.73	52452	-20.92	18.62	52416
6.53	3.37	52419	-8.72	24.72	52443	-20.92	15.57	52440
6.53	0.32	52427	-8.72	21.67	52440	-20.92	12.52	52438
6.53	-2.73	52452	-8.72	18.62	52432	-20.92	9.47	52429
3.48	24.72	52333	-8.72	15.57	52378	-20.92	6.42	52430
3.48	21.67	52428	-8.72	12.52	52641	-20.92	3.37	52421
3.48	18.62	52398	-8.72	9.47	52458	-20.92	0.32	52431
3.48	15.57	52327	-8.72	6.42	52443	-20.92	-2.73	52449
3.48	12.52	52322	-8.72	3.37	52410	-23.97	21.67	52435
3.48	9.47	53769	-8.72	0.32	52434	-23.97	15.57	52415
3.48	6.42	52501	-8.72	-2.73	52449	-23.97	12.52	52443
3.48	3.37	52450	-11.77	24.72	52437	-27.02	21.67	52476
3.48	0.32	52441	-11.77	21.67	52441	-27.02	15.57	52417
3.48	-2.73	52457	-11.77	18.62	52423			
0.43	24.72	52412	-11.77	15.57	52401			
0.43	21.67	52431	-11.77	12.52	52393			
0.43	18.62	52415	-11.77	9.47	52421			
0.43	15.57	52308	-11.77	6.42	52416			
0.43	12.52	53080	-11.77	3.37	52421			
0.43	9.47	53395	-11.77	0.32	52433			
0.43	6.42	52536	-11.77	-2.73	52444			
0.43	3.37	52444	-14.82	24.72	52442			
0.43	0.32	52441	-14.82	21.67	52417			
0.43	-2.73	52457	-14.82	18.62	52410			
-2.62	24.72	52430	-14.82	15.57	52421			
-2.62	21.67	52439	-14.82	12.52	52418			
-2.62	18.62	52428	-14.82	9.47	52423			
-2.62	15.57	52373	-14.82	6.42	52371			
-2.62	12.52	52074	-14.82	3.37	52420			
-2.62	9.47	52290	-14.82	0.32	52429			
-2.62	6.42	52418	-14.82	-2.73	52451			
-2.62	3.37	52435	-17.87	24.72	52446			
-2.62	0.32	52439	-17.87	21.67	52440			
-2.62	-2.73	52453	-17.87	18.62	52491			
-5.67	24.72	52439	-17.87	15.57	52433			
-5.67	21.67	52445	-17.87	12.52	52438			
-5.67	18.62	52426	-17.87	9.47	52408			

Appendix IIA: 1993 Magnetic Survey Data

Section I Uncorrected (Uncorr) and Diurnally Corrected (Corr) Magnetic Data for Top and Bottom (Bott), collected March 15, 1993.

Values preceded by "?" accurate to 1 nT.

Y Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
5	0	51822.1	51822.1	0	51818.1	51818.1	0
5	1	51819.6	51819.5	0.1	51818	51817.9	0.1
5	2	51820	51819.8	0.2	51818.6	51818.5	0.1
5	3	51819.1	51818.8	0.3	51820.1	51819.9	0.2
5	4	51821.5	51821.1	0.4	51823	51822.7	0.3
5	5	51822.8	51822.3	0.5	51828.8	51828.4	0.4
5	6	51829.6	51829.1	0.5	51840.1	51839.6	0.5
5	7	51844.1	51843.5	0.6	51859.8	51859.2	0.6
5	8	51875.7	51874.9	0.8	51901.5	51900.8	0.7
5	9	51967.4	51966.5	0.9	51987.4	51986.6	0.8
5	10	?52199.2	52198.2	1	52123.3	52122.4	0.9
5	11	?52309.4	52308.3	1.1	?52160.8	52159.8	1
5	12	?51912.0	51910.8	1.2	52032	52030.9	1.1
5	13	?51659.6	51658.3	1.3	51860.9	51859.8	1.1
5	14	?51579.4	51578	1.4	51749	51747.8	1.2
5	15	51626.6	51625.2	1.4	51720.7	51719.4	1.3
5	16	51707.9	51706.4	1.5	51737.5	51736.1	1.4
5	17	51759.8	51758.2	1.6	51762.5	51761	1.5
5	18	51777.7	51776	1.7	51778.2	51776.7	1.5
5	19	51794.4	51792.6	1.8	51790.4	51788.8	1.6
4	19	51783.3	51781	2.3	51786.2	51784.1	2.1
4	18	51754.6	51752.2	2.4	51765.1	51762.9	2.2
4	17	51687.5	51684.9	2.6	51728.2	51725.9	2.3
4	16	?51556.9	51554.2	2.7	51689	51686.6	2.4
4	15	?51487.9	51485.1	2.8	51720.2	51717.7	2.5
4	14	?52092.1	52089.2	2.9	51914.5	51911.9	2.6
4	13	?52459.4	52456.3	3.1	?52131.0	52128.2	2.8
4	12	?53470.7	53467.5	3.2	?52408.4	52405.5	2.9
4	11	?53618.0	53614.7	3.3	?52469.8	52466.8	3
4	10	?52243.1	52239.6	3.5	52179.2	52176.1	3.1
4	9	51914.1	51910.5	3.6	51963.3	51960	3.3
4	8	51858.5	51854.8	3.7	51886.8	51883.4	3.4
4	7	51826.2	51822.4	3.8	51848	51844.5	3.5
4	6	51814.7	51810.8	3.9	51834.9	51831.4	3.5
4	5	51814	51810	4	51827.8	51824.2	3.6
4	4	51813.4	51809.3	4.1	51824.2	51820.5	3.7
4	3	51813	51808.8	4.2	51822.7	51818.9	3.8
4	2	51810.3	51806	4.3	51821.9	51818	3.9
4	1	51814.9	51810.5	4.4	51821.8	51817.9	3.9
4	0	51813.7	51809.2	4.5	51821.9	51817.9	4
3	0	51828.1	51822.9	5.2	51822.7	51817.7	5
3	1	51829.7	51824	5.7	51823.5	51817.9	5.6
3	2	51829.5	51823.7	5.8	51823.5	51817.8	5.7
3	3	51827.1	51821.3	5.8	51825.2	51819.4	5.8
3	4	51824.2	51818.3	5.9	51828.2	51822.2	6

Magnetic Survey of a Portion of Gunsite 720 Waste Unit

Appendix IIA: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
3	5	51829.7	51823.7	6	51834	51827.9	61
3	6	51837.3	51831.2	61	51845.8	51839.6	62
3	7	51857	51850.8	62	51868.5	51862.1	64
3	8	51896.5	51890.2	63	51937.3	51930.8	65
3	9	?52068.6	52062.2	64	52102	52095.4	66
3	10	?52872.9	52866.4	65	?52410.5	52403.7	68
3	11	?53657.8	53651.2	66	?52440.7	52433.7	7
3	12	?52965.6	52958.8	68	?52289.4	52282.1	73
3	13	?52301.5	52294.6	69	51997.3	51989.8	75
3	14	?51846.2	51839.2	7	51805.8	51798.2	76
3	15	?51415.4	51408.1	73	51683.5	51675.6	79
3	16	51629.5	51622.2	73	51703.5	51695.5	8
3	17	51733.5	51726	75	51742.8	51734.6	82
3	18	51777.2	51769.7	75	51773.4	51765.1	83
3	19	51805.7	51798.1	76	51792.5	51784	85
2	19	51786.1	51778.2	79	51795.8	51787	88
2	18	51773.5	51765.5	8	51775.8	51766.8	9
2	17	51730.8	51722.7	81	51744.8	51735.6	92
2	16	51610.7	51602.5	82	51687.2	51677.9	93
2	15	?51373.3	51364.9	84	51632.1	51622.6	95
2	14	51493.1	51484.6	85	51664.5	51654.8	97
2	13	?51450.9	51442.2	87	51797.1	51787.1	10
2	12	?52376.9	52368.1	88	?52045.9	52035.8	10.1
2	11	?52633.6	52624.7	89	?52169.1	52158.7	10.4
2	10	?51864.9	51855.8	91	51968.7	51958	10.7
2	9	51814.1	51804.9	92	51876.2	51865.4	10.8
2	8	51822.5	51813.2	93	51851	51840.1	10.9
2	7	51813.6	51804.2	94	51836.3	51825.3	11
2	6	51818	51808.5	95	51832.2	51821	11.2
2	5	51818.7	51809.1	96	51829.8	51818.5	11.3
2	4	51817.7	51808	97	51828.6	51817.1	11.5
2	3	51815.6	51805.8	98	51828.5	51816.9	11.6
2	2	51818.6	51808.8	98	51828.6	51816.9	11.7
2	1	51816.6	51806.7	99	51828.4	51816.6	11.8
2	0	51819.2	51809.2	10	51828.5	51816.5	12
1	0	51836.2	51825.4	10.8	51829	51816.8	12.2
1	1	51833.7	51822.4	11.3	51829	51816.4	12.6
1	2	51830.4	51818.9	11.5	51828.7	51816.1	12.6
1	3	51832.5	51820.9	11.6	51829.3	51816.7	12.6
1	4	51832.8	51821	11.8	51830.3	51817.6	12.7
1	5	51831.7	51819.7	12	51832.4	51819.7	12.7
1	6	51830.2	51818	12.2	51836.1	51823.4	12.7
1	7	51830.4	51818	12.4	51843.6	51830.8	12.8
1	8	51836.3	51823.8	12.5	51860.7	51847.9	12.8
1	9	51836.1	51823.4	12.7	51904.3	51891.5	12.8
1	10	?51873.5	51860.6	12.9	51975.3	51962.4	12.9
1	11	?52366.3	52353.2	13.1	?52049.0	52036.1	12.9
1	12	?51812.5	51798.9	13.6	51893.6	51880.6	13
1	13	?51383.8	51370	13.8	51713.3	51700.3	13
1	14	?51410.4	51396.4	14	51642.5	51629.4	13.1
1	15	?51457.4	51443	14.4	51646.4	51633.2	13.2

Appendix IIA: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
1	16	51649.2	51634.6	14.6	51698.2	51685	13.2
1	17	51766.2	51751.3	14.9	51758.7	51745.5	13.2
1	18	51797.5	51782.5	15	51784.1	51770.8	13.3
1	19	51823.7	51808.4	15.3	51800.8	51787.5	13.3
1	20	51823.7	51808.2	15.5	51806.7	51793.3	13.4
0	20	51804.5	51788.6	15.9	51809.2	51795.8	13.4
0	19	51798.1	51782	16.1	51800.5	51787	13.5
0	18	51786.2	51769.9	16.3	51788.6	51775.1	13.5
0	17	51750.9	51734.4	16.5	51762	51748.5	13.5
0	16	51717.3	51700.5	16.8	51735.8	51722.2	13.6
0	15	51666.5	51649.4	17.1	51705.8	51692.2	13.6
0	14	51573.5	51556.1	17.4	51681.2	51667.5	13.7
0	13	51564.6	51546.9	17.7	51685.3	51671.6	13.7
0	12	51553.4	51535.6	17.8	51721.1	51707.3	13.8
0	11	51659.2	51641.2	18	51775.6	51761.8	13.8
0	10	51758.5	51740.3	18.2	51812.7	51798.9	13.8
0	9	51797.1	51778.7	18.4	51825.3	51811.4	13.9
0	8	51804.4	51785.8	18.6	51827.3	51813.4	13.9
0	7	51808.9	51790.2	18.7	51826.5	51812.6	13.9
0	6	51816.2	51797.3	18.9	51825.5	51811.5	14
0	5	51817.2	51798	19.2	51826.3	51812.3	14
0	4	51817.4	51797.9	19.5	51826.7	51812.6	14.1
0	3	51818.6	51798.9	19.7	51827.2	51813.1	14.1
0	2	51818.7	51798.8	19.9	51827.6	51813.4	14.2
0	1	51820.9	51800.7	20.2	51828.5	51814.3	14.2
0	0	51824	51803.6	20.4	51829.2	51814.9	14.3
0	13	51224.9	51203.6	21.3	51695.4	51680.6	14.8
-1	13	51429.0	51407.7	21.3	51653.6	51638.7	14.9
-2	13	51691.9	51670.6	21.3	51724.8	51709.8	15
-3	13	51772.4	51751.1	21.3	51777.8	51762.7	15.1
-4	13	51793.3	51772	21.3	51796.1	51780.9	15.2
-5	13	51801	51779.7	21.3	51805.6	51790.4	15.2
-6	13	51806.4	51785.1	21.3	51811.5	51796.2	15.3
-7	13	51811	51789.6	21.4	51815.7	51800.3	15.4
-8	13	51807.4	51786	21.4	51818.2	51802.7	15.5
-9	13	51816.4	51795	21.4	51820.3	51804.7	15.6
-10	13	51815.6	51794.2	21.4	51821.4	51805.8	15.6
-11	13	51814.8	51793.4	21.4	51822.3	51806.6	15.7
-12	13	51816.9	51795.5	21.4	51822.6	51806.8	15.8
-13	13	51812.5	51791.1	21.4	51822.7	51806.8	15.9
-14	13	51814.6	51793.2	21.4	51822.9	51806.9	16
-15	13	51812.9	51791.4	21.5	51822	51806	16
-16	13	51815.2	51793.7	21.5	51821.9	51805.8	16.1
-17	13	51810	51788.5	21.5	51820.5	51804.3	16.2
-18	13	51804	51782.5	21.5	51819.4	51803.1	16.3
-19	13	51806.1	51784.6	21.5	51818.6	51802.3	16.3
-20	13	51808.1	51786.6	21.5	51817.8	51801.4	16.4
-21	13	51813.3	51791.8	21.5	51818	51801.5	16.5
4	13	52698.1	52676.2	21.9	52219.8	52203	16.8
5	13	51891.1	51869	22.1	52021.8	52004.5	17.3
6	13	51803.2	51781	22.2	51877.7	51860.4	17.3
7	13	51793.3	51771	22.3	51832.3	51814.9	17.4

Magnetic Survey of a Portion of Gunsite 720 Waste Unit

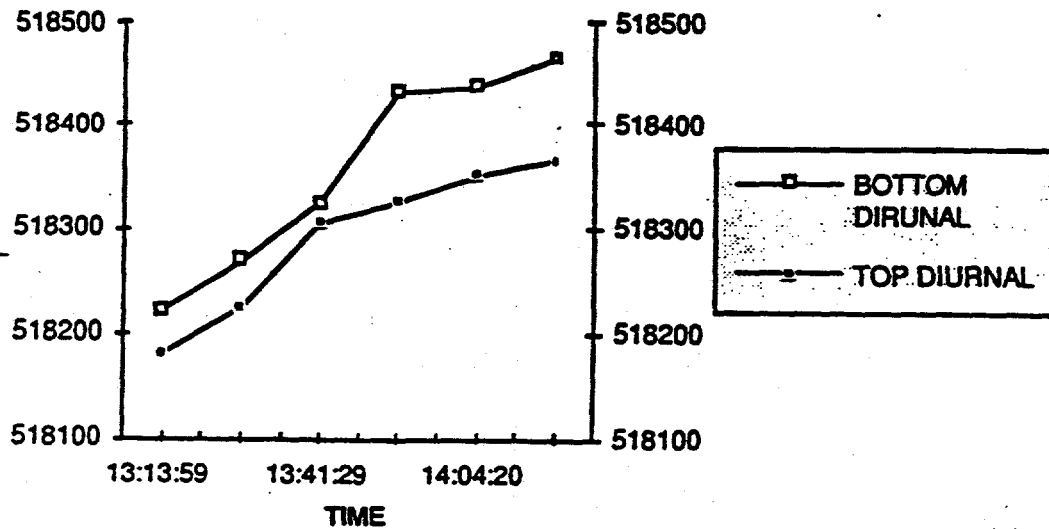
Appendix IIA: 1993 Magnetic Survey Data (Contd)

<u>X</u> <u>Coord.</u>	<u>Y</u> <u>Coord.</u>	<u>Bott.</u> <u>Uncorr.</u>	<u>Bott.</u> <u>Corr.</u>	<u>Bott.</u> <u>Diff.</u>	<u>Top</u> <u>Uncorr.</u>	<u>Top</u> <u>Corr.</u>	<u>Top</u> <u>DHL</u>
8	13	51777.1	51754.7	22.4	51814.9	51797.5	17.4
9	13	51771.3	51748.8	22.5	51818.3	51800.9	17.4
10	13	51780.9	51758.3	22.6	51853.1	51835.6	17.5
11	13	52023.6	52000.9	22.7	51937.3	51919.7	17.6
12	13	52059.5	52036.7	22.8	51948	51930.4	17.6
13	13	51891.8	51868.9	22.9	51890.4	51872.7	17.7
14	13	51837.6	51814.6	23	51850.8	51833.1	17.7
15	13	51815.5	51792.4	23.1	51828.1	51810.3	17.8
16	13	51809.3	51786.1	23.2	51815	51797.2	17.8
17	13	51794.1	51770.8	23.3	51802.9	51785	17.9
18	13	51780.9	51757.5	23.4	51786.1	51768.2	17.9
19	13	51740.8	51717.3	23.5	51761.8	51743.8	18
20	13	51669.4	51645.8	23.6	51744.5	51726.5	18
21	13	51695.0	51671.3	23.7	51754.9	51736.8	18.1
22	13	52011.7	51987.9	23.8	51812.8	51794.7	18.1
23	13	51812.2	51788.3	23.9	51814.5	51796.3	18.2

Section I Diurnal Variation

Bottom				Top			
Day	Time	Station	Field (nT)	Day	Time	Station	Field (nT)
35	13:13:59	0	51822.1	35	13:14:02	1	51818.1
35	13:26:48	80	51826.9	35	13:26:51	81	51822.4
35	13:41:29	162	51832.4	35	13:41:33	163	51830.5
35	13:56:08	248	51843.3	35	13:56:11	249	51832.5
35	14:04:20	294	51843.7	35	14:04:23	295	51835.1
35	14:11:02	336	51846.5	35	14:11:05	337	51836.5

Section I Diurnal Variation ©



Appendix IIB: 1993 Magnetic Survey Data

**Section II Uncorrected (Uncorr) and Diurnally Corrected (Corr) Magnetic Data
(collected May 17, 1993)**

Values preceded by "?" accurate to 1 nT.

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
4	7	?51945.3	51945.3	0	51949.2	51949.2	0
5	7	51927.4	51927.6	-0.2	51938	51937.9	0.1
6	7	51905.6	51906	-0.4	51914.4	51914.3	0.1
7	7	51881.8	51882.4	-0.6	51889.1	51888.9	0.2
8	7	51864.4	51865.2	-0.8	51868.9	51868.6	0.3
9	7	51850.1	51851.1	-1	51855.5	51855.2	0.3
10	7	51842.4	51843.6	-1.2	51846.6	51846.2	0.4
11	7	51844.6	51846	-1.4	51841.6	51841.1	0.5
12	7	?51840.6	51842.2	-1.6	51840	51839.5	0.5
13	7	51837.7	51839.5	-1.8	51841.5	51840.9	0.6
14	7	51837.2	51839.2	-2	51843.9	51843.2	0.7
15	7	51840.2	51842.4	-2.2	51845.3	51844.6	0.7
16	7	51840.1	51842.4	-2.3	51845.6	51844.8	0.8
17	7	51846.4	51848.9	-2.5	51850.2	51849.4	0.8
18	7	51859.5	51862.2	-2.7	51866.1	51865.2	0.9
19	7	51903.2	51906	-2.8	51892.6	51891.6	1
20	7	?51945.2	51948.2	-3	51910.8	51909.8	1
21	7	51923.4	51926.6	-3.2	51897.4	51896.3	1.1
21	8	52026	52030.1	-4.1	51951.5	51950.1	1.4
20	8	?52102.5	52106.8	-4.3	51977.3	51975.9	1.4
19	8	51974.6	51979.1	-4.5	51935.3	51933.8	1.5
18	8	51859.7	51864.4	-4.7	51887.4	51885.8	1.6
17	8	51822.7	51827.6	-4.9	51862.4	51860.8	1.6
16	8	51828.8	51833.9	-5.1	51857.6	51855.9	1.7
15	8	51832.4	51837.6	-5.2	51861	51859.3	1.7
14	8	51829	51834.4	-5.4	51857.9	51856.1	1.8
13	8	51819.2	51824.8	-5.6	51849.6	51847.7	1.9
12	8	51813.2	51819	-5.8	51841.8	51839.9	1.9
11	8	51814.7	51820.6	-5.9	51840.5	51838.5	2
10	8	51822.4	51828.5	-6.1	51845.8	51843.8	2
9	8	51833	51839.2	-6.2	51857.3	51855.2	2.1
8	8	51849.2	51855.6	-6.4	51877.2	51875.1	2.1
7	8	51880.6	51887.2	-6.6	51910.6	51908.4	2.2
6	8	51920.2	51926.9	-6.7	51959.1	51956.9	2.2
5	8	51972.5	51979.4	-6.9	52018	52015.7	2.3
4	8	?52012.5	52019.6	-7.1	52057	52054.6	2.4
4	9	?52237.2	52245.4	-8.2	?52242.8	52240.7	2.1
5	9	?52133.3	52142.5	-9.2	52143.5	52141.3	2.2
6	9	52004.4	52013.9	-9.5	52032	52029.9	2.1
7	9	51920	51929.8	-9.8	51938.9	51936.9	2
8	9	51877.2	51887.3	-10.1	51886.3	51884.3	2
9	9	51846.3	51856.8	-10.5	51857.6	51855.7	1.9

Appendix IIB: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
10	9	51834.4	51845.2	-10.8	51844.1	51842.3	1.8
11	9	51826.4	51837.4	-11	51841	51839.3	1.7
12	9	51835	51846.3	-11.3	51853	51851.4	1.6
13	9	51861.5	51873.1	-11.6	51876.5	51874.9	1.6
14	9	51885.9	51897.8	-11.9	51898	51896.5	1.5
15	9	51893.7	51905.9	-12.2	51900.1	51898.7	1.4
16	9	51876.9	51889.3	-12.4	51884.4	51883.1	1.3
17	9	51861.5	51874.2	-12.7	51879.8	51878.6	1.2
18	9	51909.4	51922.4	-13	51908.7	51907.5	1.2
19	9	52112.1	52125.4	-13.3	51975.8	51974.7	1.1
20	9	52254.4	52267.9	-13.5	52011.7	52010.7	1
21	9	52093.8	52107.6	-13.8	51965.8	51964.9	0.9
21	10	51980.4	51995.1	-14.7	51933.9	51933.2	0.7
20	10	52071.9	52087	-15.1	51962.9	51962.3	0.6
19	10	51958	51973.4	-15.4	51933.3	51932.8	0.5
18	10	51844.5	51860.2	-15.7	51895.3	51894.9	0.4
17	10	51854.3	51870.2	-15.9	51899.2	51898.8	0.4
16	10	51925.4	51941.7	-16.3	51940.1	51939.8	0.3
15	10	52001.5	52018.1	-16.6	51987.6	51987.4	0.2
14	10	52004.8	52021.6	-16.8	51986.8	51986.7	0.1
13	10	521895.9	51913	-17.1	51927.3	51927.3	0
12	10	51814.7	51832.1	-17.4	51862.3	51862.3	0
11	10	521792.6	51810.3	-17.7	51839.3	51839.4	-0.1
10	10	51803.5	51821.5	-18	51837.1	51837.3	-0.2
9	10	51817.3	51835.6	-18.3	51852.4	51852.7	-0.3
8	10	51847.3	51865.9	-18.6	51888.1	51888.5	-0.4
7	10	51918.8	51937.7	-18.9	51952.6	51953.1	-0.5
6	10	52086	52105.2	-19.2	52116.4	52116.9	-0.5
5	10	52522.2	52541.7	-19.5	52415	52415.6	-0.6
4	10	53018.4	53038.2	-19.8	52639.1	52639.8	-0.7
4	11	524345.6	54365.6	-20	53016.7	53017.2	-0.5
5	11	522873.5	52894.3	-20.8	52528.5	52529.1	-0.6
6	11	522100	52120.8	-20.8	52136	52136.6	-0.6
7	11	51906.1	51927	-20.9	51946.5	51947	-0.5
8	11	51845.8	51866.8	-21	51873.4	51873.9	-0.5
9	11	51816.9	51837.9	-21	51839.4	51839.8	-0.4
10	11	51803.8	51824.9	-21.1	51826.9	51827.3	-0.4
11	11	51801.6	51822.7	-21.1	51835.7	51836.1	-0.4
12	11	521847.8	51869	-21.2	51889.6	51889.9	-0.3
13	11	52073.5	52094.7	-21.2	52014.9	52015.2	-0.3
14	11	52427.5	52448.8	-21.3	52142.4	52142.6	-0.2
15	11	52321.1	52342.4	-21.3	52110.8	52111	-0.2
16	11	52042.2	52063.6	-21.4	51999.8	51999.9	-0.1
17	11	51908.5	51929.9	-21.4	51917	51917.1	-0.1
18	11	51858.7	51880.2	-21.5	51884.3	51884.3	0
19	11	51869.3	51890.8	-21.5	51886.8	51886.8	0
20	11	51888.3	51909.9	-21.6	51890.1	51890.1	0
21	11	51874.4	51896	-21.6	51872.6	51872.5	0.1
21	12	51807.2	51830.9	-23.7	51831.8	51830	1.8
20	12	51811	51834.7	-23.7	51840.9	51839	1.9
19	12	51814.5	51838.3	-23.8	51849	51847.1	1.9

Appendix IIB: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
18	12	51832	51855.8	-23.8	51865.6	51863.6	2
17	12	51891.5	51915.4	-23.9	51913.1	51911.1	2
16	12	52058.9	52082.9	-24	52015.2	52013.1	2.1
15	12	52513.7	52537.7	-24	52171	52168.9	2.1
14	12	52575	52599.1	-24.1	52211.8	52209.6	22
13	12	52154.8	52178.9	-24.1	52030.2	52028	22
12	12	51808.6	51832.8	-24.2	51881.2	51878.9	23
11	12	51761.4	51785.6	-24.2	51821.9	51819.6	23
10	12	51767.3	51791.6	-24.3	51812.7	51810.4	23
9	12	51781.4	51805.7	-24.3	51821.3	51818.9	24
8	12	51805.4	51829.8	-24.4	51847	51844.6	24
7	12	51829.9	51854.3	-24.4	51899.5	51897	25
6	12	51919.4	51943.9	-24.5	52031.6	52029.1	25
5	12	52330.9	52355.4	-24.5	52311.3	52308.7	26
4	12	52323.1	52356.7	-24.6	52260.5	52260.4	26
4	13	52485.2	52509.3	-24.1	52266.9	52264	29
5	13	51863.2	51887.2	-24	52072.2	52069	32
6	13	51780.6	51804.4	-23.8	51890	51886.7	33
7	13	51786.5	51810.2	-23.7	51838.2	51834.8	34
8	13	51789.8	51813.4	-23.6	51816.3	51812.9	34
9	13	51781.9	51805.4	-23.5	51803.2	51799.7	35
10	13	51773.7	51797	-23.3	51799.5	51795.9	36
11	13	51762.4	51785.6	-23.2	51807.2	51803.6	36
12	13	51782.8	51805.8	-23	51854.7	51851	37
13	13	52005.8	52028.7	-22.9	51971.7	51967.9	38
14	13	52323.6	52346.3	-22.7	52086	52082.1	39
15	13	52213.8	52236.4	-22.6	52066.6	52062.7	39
16	13	51979.3	52001.7	-22.4	51959.2	51955.2	4
17	13	51879.4	51901.7	-22.3	51883.1	51879	4.1
18	13	51835.5	51857.6	-22.1	51847.2	51843	42
19	13	51821.4	51843.4	-22	51833.7	51829.5	42
20	13	51818.6	51840.5	-21.9	51823.7	51819.4	43
21	13	51816.5	51838.2	-21.7	51814.9	51810.5	44
21	14	51786.4	51807.3	-20.9	51806.8	51802	48
20	14	51794	51814.8	-20.8	51815.8	51810.9	49
19	14	51800.3	51820.9	-20.6	51824.8	51819.8	5
18	14	51809.1	51829.6	-20.5	51837.2	51832.2	5
17	14	51829.3	51849.7	-20.4	51858.1	51853	5.1
16	14	51866.2	51886.4	-20.2	51895.6	51890.4	52
15	14	51911.1	51931.2	-20.1	51934	51928.8	52
14	14	51894.3	51914.3	-20	51924.8	51919.5	53
13	14	51781.4	51801.2	-19.8	51859.6	51854.2	54
12	14	51727.1	51746.8	-19.7	51807.8	51802.4	54
11	14	51736.9	51756.5	-19.6	51791.4	51785.9	55
10	14	51745.2	51764.6	-19.4	51788.9	51783.3	56
9	14	51755.3	51774.6	-19.3	51789.5	51783.9	56
8	14	51748.6	51767.7	-19.1	51789.6	51783.9	57
7	14	51722	51741	-19	51790.2	51784.4	58

Appendix IIB: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top Diff.
6	14	251656.8	51675.7	-18.9	51802.8	51797	5.8
5	14	251679	51697.7	-18.7	51893.5	51887.6	5.9
4	14	252228.4	52247	-18.6	252012.5	52006.5	6
4	15	251668.9	51687.4	-18.5	51774.2	51768.1	6.1
5	15	251573.3	51591.4	-18.1	51747.9	51741.6	6.3
6	15	251667.2	51685.3	-18.1	51743.5	51737.2	6.3
7	15	251724.9	51743	-18.1	51760.6	51754.3	6.3
8	15	51762.3	51780.3	-18	51776.6	51770.3	6.3
9	15	51778	51796	-18	51785.1	51778.8	6.3
10	15	251769.5	51787.5	-18	51785.9	51779.6	6.3
11	15	51769.9	51787.9	-18	51788	51781.7	6.3
12	15	51762.1	51780.1	-18	51795.7	51789.3	6.4
13	15	51774.6	51792.6	-18	51811.6	51805.2	6.4
14	15	251799.6	51817.5	-17.9	51833	51826.6	6.4
15	15	51816.1	51834	-17.9	51838.2	51831.8	6.4
16	15	51821.2	51839.1	-17.9	51835.7	51829.3	6.4
17	15	51819.8	51837.7	-17.9	51829.1	51822.7	6.4
18	15	51818.7	51836.6	-17.9	51822.4	51816	6.4
19	15	51812.2	51830	-17.8	51816.3	51809.9	6.4
20	15	51813.1	51830.9	-17.8	51810	51803.6	6.4
21	15	51802.4	51820.2	-17.8	51801.4	51794.9	6.5
21	16	51791.4	51809.1	-17.7	51802.1	51795.6	6.5
20	16	51796.9	51814.6	-17.7	51809.1	51802.5	6.6
19	16	51801	51818.6	-17.6	51814.1	51807.5	6.6
18	16	51802	51819.6	-17.6	51817.6	51811	6.6
17	16	51795.7	51813.3	-17.6	51819.2	51812.6	6.6
16	16	51794.1	51811.7	-17.6	51816.9	51810.3	6.6
15	16	51786.1	51803.7	-17.6	51816.1	51809.5	6.6
14	16	51776.6	51794.2	-17.6	51809.2	51802.6	6.6
13	16	51767.1	51784.6	-17.5	51802.1	51795.5	6.6
12	16	51761.9	51779.4	-17.5	51794.7	51788	6.7
11	16	51768.7	51786.2	-17.5	51791.7	51785	6.7
10	16	51766	51783.5	-17.5	51788.4	51781.7	6.7
9	16	51766.8	51784.3	-17.5	51784.2	51777.5	6.7
8	16	51751.5	51768.9	-17.4	51773.4	51766.7	6.7
7	16	51718.1	51735.5	-17.4	51755.8	51749.1	6.7
6	16	51668.9	51686.3	-17.4	51728.3	51721.6	6.7
5	16	251579.5	51596.9	-17.4	51696.4	51689.6	6.8
4	16	251461.6	51479	-17.4	251660.2	51653.4	6.8
4	17	251594.5	51611.7	-17.2	51680.6	51673.8	6.8
5	17	51676.5	51693.6	-17.1	51715.1	51708.3	6.8
6	17	51722.8	51739.9	-17.1	51742.7	51735.9	6.8
7	17	51748	51765.1	-17.1	51763	51756.2	6.8
8	17	51780.6	51797.7	-17.1	51779.8	51773	6.8
9	17	51792.6	51809.7	-17.1	51789.1	51782.3	6.8
10	17	51798.3	51815.3	-17	51795.4	51788.6	6.8
11	17	51798.5	51815.5	-17	51797.8	51791	6.8
12	17	51795.3	51812.3	-17	51800.5	51793.7	6.8

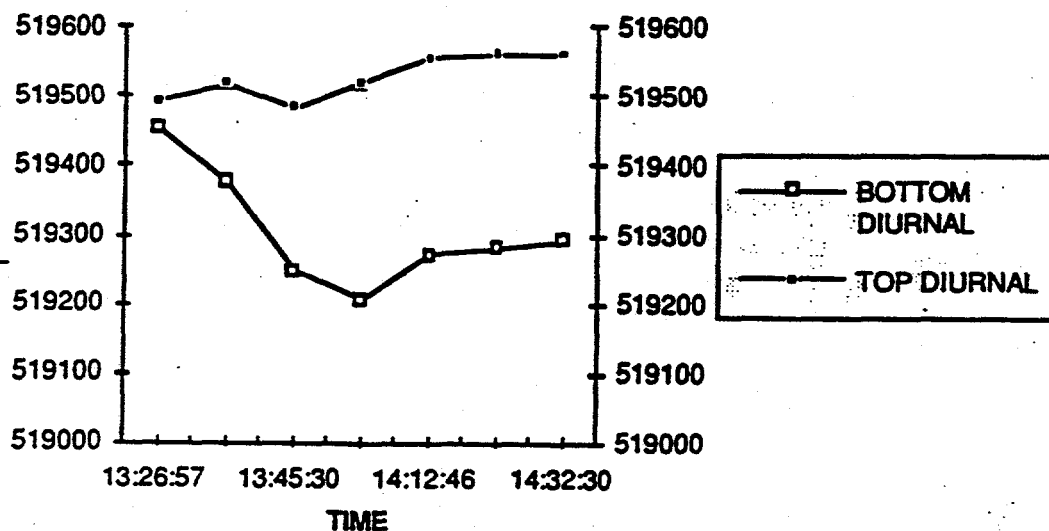
Appendix IIB: 1993 Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bott. Uncorr.	Bott. Corr.	Bott. Diff.	Top Uncorr.	Top Corr.	Top DHL
13	17	51800.3	51817.3	-17	51804.5	51797.7	68
14	17	51805.4	51822.3	-16.9	51808.1	51801.3	68
15	17	51804.2	51821.1	-16.9	51810.6	51803.8	68
16	17	51815	51831.9	-16.9	51812.8	51806	68
17	17	51816.1	51833	-16.9	51815.8	51809	68
18	17	51819.7	51836.6	-16.9	51817.1	51810.3	68
19	17	51820.6	51837.4	-16.8	51815.7	51808.9	68
20	17	51816.4	51833.2	-16.8	51811.7	51804.9	68
21	17	51815.3	51832.1	-16.8	51805.9	51799.1	68
21	18	51803	51819.7	-16.7	51807.2	51800.5	67
20	18	51806.6	51823.2	-16.6	51812.7	51806	67
19	18	51807.7	51824.3	-16.6	51816.7	51810	67
18	18	51800.5	51817.1	-16.6	51818.6	51811.9	67
17	18	51802.9	51819.5	-16.6	51817	51810.3	67
16	18	51782.5	51799	-16.5	51813.5	51806.8	67
15	18	51791.5	51808	-16.5	51812.1	51805.4	67
14	18	51795.5	51812	-16.5	51811.4	51804.7	67
13	18	51791.8	51808.3	-16.5	51809.4	51802.7	67
12	18	51785.2	51801.6	-16.4	51806.5	51799.8	67
11	18	51788	51804.4	-16.4	51804.5	51797.8	67
10	18	51787.1	51803.5	-16.4	51801.3	51794.6	67
9	18	51785.7	51802.1	-16.4	51796.4	51789.7	67
8	18	51776.1	51792.5	-16.4	51787.8	51781.1	67
7	18	51756.3	51772.6	-16.3	51775.7	51769	67
6	18	51743.4	51759.7	-16.3	51762	51755.3	67
5	18	51720	51736.3	-16.3	51745.5	51738.8	67
4	18	51695.6	51711.9	-16.3	51722.2	51715.5	67

Section II Diurnal Variation

Bottom				Top			
Day	Time	Station	Field (nT)	Day	Time	Station	Field (nT)
153	13:26:57	0	51945.3	153	13:27:01	1	51949.2
153	13:36:19	72	51937.5	153	13:36:22	73	51951.8
153	13:45:30	146	51924.8	153	13:45:33	147	51948.3
153	14:02:25	220	51920.5	153	14:02:28	221	51952.0
153	14:12:46	294	51927.1	153	14:12:50	295	51955.4
153	14:22:40	368	51928.0	153	14:22:43	369	51956.0
153	14:32:30	442	51929.1	153	14:32:33	443	51955.9

Section II Diurnal Variation



Appendix IIC: Magnetic Survey Data

Section I and Section II Combined Data Set (Diurnally Corrected)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
5	0	51822.1	51818.1	33	10	35	131359	0
5	1	51819.5	51817.9	13	10	35	131412	2
5	2	51819.8	51818.5	1.1	10	35	131425	4
5	3	51818.8	51819.9	-9	10	35	131440	6
5	4	51821.1	51822.7	-13	10	35	131458	8
5	5	51822.3	51828.4	-50	10	35	131512	10
5	6	51829.1	51839.6	-86	10	35	131527	12
5	19	51792.6	51788.8	3.1	10	35	131850	38
4	19	51781	51784.1	-2.5	110	35	132014	40
4	6	51810.8	51831.4	-16.9	110	35	132429	66
4	5	51810	51824.2	-11.6	110	35	132444	68
4	4	51809.3	51820.5	-9.2	110	35	132458	70
4	3	51808.8	51818.9	-8.3	110	35	132512	72
4	2	51806	51818	-9.8	110	35	132529	74
4	1	51810.5	51817.9	-6.1	110	35	132541	76
4	0	51809.2	51817.9	-7.1	110	35	132557	78
3	0	51822.9	51817.7	43	310	35	132833	82
3	1	51824	51817.9	50	310	35	132908	84
3	2	51823.7	51817.8	48	310	35	132921	86
3	3	51821.3	51819.4	1.6	310	35	132935	88
3	4	51818.3	51822.2	-3.2	310	35	132950	90
3	5	51823.7	51827.9	-3.4	310	35	133006	92
3	6	51831.2	51839.6	-6.9	310	35	133019	94
3	7	51850.8	51862.1	-9.3	310	35	133033	96
3	8	51890.2	51930.8	-33.3	310	35	133048	98
3	9	52062.2	52095.4	-27.2	310	35	133101	100
3	10	52866.4	52403.7	379.3	310	35	133116	102
3	11	53651.2	52433.7	998.0	310	35	133140	104
3	12	52958.8	52282.1	554.7	310	35	133216	106
3	13	52294.6	51989.8	249.8	310	35	133231	108
3	14	51839.2	51798.2	33.6	310	35	133247	110
3	15	51408.1	51675.6	-219.3	310	35	133321	112
3	16	51622.2	51695.5	-60.1	310	35	133335	114
3	17	51726	51734.6	-7.0	310	35	133353	116
3	18	51769.7	51765.1	3.8	310	35	133407	118
3	19	51798.1	51784	11.6	310	35	133422	120
2	19	51778.2	51787	-7.2	410	35	133501	122
2	18	51765.5	51766.8	-1.1	410	35	133522	124
2	17	51722.7	51735.6	-10.6	410	35	133541	126
2	16	51602.5	51677.9	-61.8	410	35	133556	128
2	15	51364.9	51622.6	-211.2	410	35	133618	130
2	14	51484.6	51654.8	-139.5	410	35	133635	132
2	13	51442.2	51787.1	-282.7	410	35	133709	134
2	12	52368.1	52035.8	272.4	410	35	133723	136

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
2	11	52624.7	52158.7	382.0	410	35	133747	138
2	10	51855.8	51958	-83.8	410	35	133820	140
2	9	51804.9	51865.4	-49.6	410	35	133835	142
2	8	51813.2	51840.1	-22.0	410	35	133848	144
2	7	51804.2	51825.3	-17.3	410	35	133901	146
2	6	51808.5	51821	-10.2	410	35	133915	148
2	5	51809.1	51818.5	-7.7	410	35	133930	150
2	4	51808	51817.1	-7.5	410	35	133947	152
2	3	51805.8	51816.9	-9.1	410	35	134002	154
2	2	51808.8	51816.9	-6.6	410	35	134016	156
2	1	51806.7	51816.6	-8.1	410	35	134029	158
2	0	51809.2	51816.5	-6.0	410	35	134048	160
1	0	51825.4	51816.8	7.0	510	35	134230	164
1	1	51822.4	51816.4	4.9	510	35	134251	166
1	2	51818.9	51816.1	2.3	510	35	134303	168
1	3	51820.9	51816.7	3.4	510	35	134315	170
1	4	51821	51817.6	2.8	510	35	134330	172
1	5	51819.7	51819.7	0	510	35	134346	174
1	6	51818	51823.4	-4.4	510	35	134402	176
1	7	51818	51830.8	-10.5	510	35	134415	178
1	8	51823.8	51847.9	-19.8	510	35	134430	180
1	9	51823.4	51891.5	-55.8	510	35	134445	182
1	10	51860.6	51962.4	-83.4	510	35	134459	184
1	11	52353.2	52036.1	259.9	510	35	134514	186
1	12	51798.9	51880.6	-67.0	510	35	134556	188
1	13	51370	51700.3	-270.7	510	35	134613	190
1	14	51396.4	51629.4	-191.0	510	35	134627	192
1	15	51443	51633.2	-155.9	510	35	134703	194
1	16	51634.6	51685	-41.3	510	35	134718	196
1	17	51751.3	51745.5	4.8	510	35	134737	198
1	18	51782.5	51770.8	9.6	510	35	134752	200
1	19	51808.4	51787.5	17.1	510	35	134810	202
1	20	51808.2	51793.3	12.2	510	35	134828	204
0	20	51788.6	51795.8	-5.9	610	35	134859	206
0	19	51782	51787	-4.1	610	35	134918	208
0	18	51769.9	51775.1	-4.3	610	35	134931	210
0	17	51734.4	51748.5	-11.6	610	35	134950	212
0	16	51700.5	51722.2	-17.8	610	35	135017	214
0	15	51649.4	51692.2	-35.1	610	35	135034	216
0	14	51556.1	51667.5	-91.3	610	35	135104	218
0	13	51546.9	51671.6	-102.2	610	35	135122	220
0	12	51535.6	51707.3	-140.7	610	35	135136	222
0	11	51641.2	51761.8	-98.9	610	35	135151	224
0	10	51740.3	51798.9	-48.0	610	35	135206	226
0	9	51778.7	51811.4	-26.8	610	35	135224	228
0	8	51785.8	51813.4	-22.6	610	35	135237	230
0	7	51790.2	51812.6	-18.4	610	35	135250	232

Magnetic Survey of a Portion of Gunsite 720 Waste Unit

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
0	6	51797.3	51811.5	-11.6	610	35	135306	234
0	5	51798	51812.3	-11.7	610	35	135326	236
0	4	51797.9	51812.6	-12.0	610	35	135350	238
0	3	51798.9	51813.1	-11.6	610	35	135407	240
0	2	51798.8	51813.4	-12.0	610	35	135427	242
0	1	51800.7	51814.3	-11.1	610	35	135448	244
0	0	51803.6	51814.9	-9.3	610	35	135503	246
4	7	51883.85	51896.85	-13.0	Averaged Values			
4	8	52050.1	52062.05	-12.0	"			
4	9	52026.5	52050.65	-24.2	"			
4	10	52638.9	52407.95	231.0	"			
4	11	53990.15	52742	1248.2	"			
4	12	53362.1	52503.95	858.2	"			
4	13	52482.8	52196.1	286.7	"			
4	14	52168.1	51959.2	208.9	"			
4	15	51586.25	51742.9	-156.7	"			
4	16	51516.6	51670	-153.4	"			
4	17	51648.3	51699.85	-51.5	"			
4	18	51732.05	51739.2	-7.1	"			
5	7	51885.55	51898.55	-13.0	"			
5	8	51927.15	51958.25	-31.1	"			
5	9	52054.5	52063.95	-9.4	"			
5	10	52369.95	52269	100.9	"			
5	11	52601.3	52344.45	256.9	"			
5	12	52133.1	52169.8	-36.7	"			
5	13	51772.75	51964.4	-191.7	"			
5	14	51637.85	51817.7	-179.8	"			
5	15	51608.3	51730.5	-122.2	"			
5	16	51651.65	51712.85	-61.2	"			
5	17	51725.9	51734.65	-8.8	"			
5	18	51756.15	51757.75	-1.6	"			
6	7	51906	51914.3	-6.8	1	153	132727	4
6	8	51926.9	51956.9	-24.6	2	153	133503	66
6	9	52013.9	52029.9	-13.1	3	153	133733	78
6	10	52105.2	52116.9	-9.6	4	153	134432	140
6	11	52120.8	52136.6	-13.0	5	153	134652	152
6	12	51943.9	52029.1	-69.8	6	153	140112	214
6	13	51804.4	51886.7	-67.5	7	153	140356	226
6	14	51675.7	51797	-99.4	8	153	141140	288
6	15	51685.3	51737.2	-42.5	9	153	141403	300
6	16	51686.3	51721.6	-28.9	10	153	142139	362
6	17	51739.9	51735.9	3.3	11	153	142414	374
6	18	51759.7	51755.3	3.6	12	153	143137	436
7	7	51882.4	51888.9	-5.3	1	153	132741	6
7	8	51887.2	51908.4	-17.4	2	153	133450	64
7	9	51929.8	51936.9	-5.8	3	153	133747	80
7	10	51937.7	51953.1	-12.6	4	153	134420	138

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
7	11	51927	51947	-16.4	5	153	134708	154
7	12	51854.3	51897	-35.0	6	153	140059	212
7	13	51810.2	51834.8	-20.2	7	153	140408	228
7	14	51741	51784.4	-35.6	8	153	141128	286
7	15	51743	51754.3	-9.3	9	153	141417	302
7	16	51735.5	51749.1	-11.1	10	153	142125	360
7	17	51765.1	51756.2	7.3	11	153	142427	376
7	18	51772.6	51769	3.0	12	153	143121	434
8	7	51865.2	51868.6	-2.8	1	153	132757	8
8	8	51855.6	51875.1	-16.0	2	153	133439	62
8	9	51887.3	51884.3	2.5	3	153	133800	82
8	10	51865.9	51888.5	-18.5	4	153	134407	136
8	11	51866.8	51873.9	-5.8	5	153	134722	156
8	12	51829.8	51844.6	-12.1	6	153	140045	210
8	13	51813.4	51812.9	4	7	153	140419	230
8	14	51767.7	51783.9	-13.3	8	153	141117	284
8	15	51780.3	51770.3	8.2	9	153	141430	304
8	16	51768.9	51766.7	1.8	10	153	142113	358
8	17	51797.7	51773	20.2	11	153	142441	378
8	18	51792.5	51781.1	9.3	12	153	143109	432
9	7	51851.1	51855.2	-3.4	1	153	132810	10
9	8	51839.2	51855.2	-13.1	2	153	133427	60
9	9	51856.8	51855.7	9	3	153	133814	84
9	10	51835.6	51852.7	-14.0	4	153	134354	134
9	11	51837.9	51839.8	-1.6	5	153	134734	158
9	12	51805.7	51818.9	-10.8	6	153	140032	208
9	13	51805.4	51799.7	4.7	7	153	140431	232
9	14	51774.6	51783.9	-7.6	8	153	141104	282
9	15	51796	51778.8	14.1	9	153	141443	306
9	16	51784.3	51777.5	5.6	10	153	142059	356
9	17	51809.7	51782.3	22.5	11	153	142453	380
9	18	51802.1	51789.7	10.2	12	153	143054	430
10	7	51843.6	51846.2	-2.1	1	153	132823	12
10	8	51828.5	51843.8	-12.5	2	153	133415	58
10	9	51845.2	51842.3	2.4	3	153	133828	86
10	10	51821.5	51837.3	-13.0	4	153	134342	132
10	11	51824.9	51827.3	-2.0	5	153	134746	160
10	12	51791.6	51810.4	-15.4	6	153	140021	206
10	13	51797	51795.9	9	7	153	140444	234
10	14	51764.6	51783.3	-15.3	8	153	141051	280
10	15	51787.5	51779.6	6.5	9	153	141454	308
10	16	51783.5	51781.7	1.5	10	153	142047	354
10	17	51815.3	51788.6	21.9	11	153	142504	382
10	18	51803.5	51794.6	7.3	12	153	143042	428
11	7	51846	51841.1	4.0	1	153	132839	14
11	8	51820.6	51838.5	-14.7	2	153	133404	56
11	9	51837.4	51839.3	-1.6	3	153	133839	88

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
11	10	51810.3	51839.4	-23.9	4	153	134329	130
11	11	51822.7	51836.1	-11.0	5	153	134758	162
11	12	51785.6	51819.6	-27.9	6	153	140009	204
11	13	51785.6	51803.6	-14.8	7	153	140456	236
11	14	51756.5	51785.9	-24.1	8	153	141037	278
11	15	51787.9	51781.7	5.1	9	153	141507	310
11	16	51786.2	51785	1.0	10	153	142033	352
11	17	51815.5	51791	20.1	11	153	142518	384
11	18	51804.4	51797.8	5.4	12	153	143030	426
12	7	51842.2	51839.5	2.2	1	153	132853	16
12	8	51819	51839.9	-17.1	2	153	133352	54
12	9	51846.3	51851.4	-4.2	3	153	133851	90
12	10	51832.1	51862.3	-24.8	4	153	134315	128
12	11	51869	51889.9	-17.1	5	153	134811	164
12	12	51832.8	51878.9	-37.8	6	153	135957	202
12	13	51805.8	51851	-37.0	7	153	140511	238
12	14	51746.8	51802.4	-45.6	8	153	141025	276
12	15	51780.1	51789.3	-7.5	9	153	141519	312
12	16	51779.4	51788	-7.0	10	153	142018	350
12	17	51812.3	51793.7	15.2	11	153	142529	386
12	18	51801.6	51799.8	1.5	12	153	143019	424
13	7	51839.5	51840.9	-1.1	1	153	132908	18
13	8	51824.8	51847.7	-18.8	2	153	133340	52
13	9	51873.1	51874.9	-1.5	3	153	133904	92
13	10	51913	51927.3	-11.7	4	153	134304	126
13	11	52094.7	52015.2	65.2	5	153	134824	166
13	12	52178.9	52028	123.7	6	153	135945	200
13	13	52028.7	51967.9	49.8	7	153	140524	240
13	14	51801.2	51854.2	-43.4	8	153	141013	274
13	15	51792.6	51805.2	-10.3	9	153	141530	314
13	16	51784.6	51795.5	-8.9	10	153	142007	348
13	17	51817.3	51797.7	16.1	11	153	142542	388
13	18	51808.3	51802.7	4.6	12	153	143007	422
14	7	51839.2	51843.2	-3.3	1	153	132921	20
14	8	51834.4	51856.1	-17.8	2	153	133328	50
14	9	51897.8	51896.5	1.1	3	153	133917	94
14	10	52021.6	51986.7	28.6	4	153	134251	124
14	11	52448.8	52142.6	251.0	5	153	134836	168
14	12	57599.1	52209.6	4417.6	6	153	135931	198
14	13	52346.3	52082.1	216.6	7	153	140539	242
14	14	51914.3	51919.5	-4.3	8	153	140959	272
14	15	51817.5	51826.6	-7.5	9	153	141543	316
14	16	51794.2	51802.6	-6.9	10	153	141954	346
14	17	51822.3	51801.3	17.2	11	153	142553	390
14	18	51812	51804.7	6.0	12	153	142956	420
15	7	51842.4	51844.6	-1.8	1	153	132933	22
15	8	51837.6	51859.3	-17.8	2	153	133315	48

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor (nT)	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
15	9	51905.9	51898.7	5.9	3	153	133929	96
15	10	52018.1	51987.4	25.2	4	153	134239	122
15	11	52342.4	52111	189.7	5	153	134848	170
15	12	52537.7	52168.9	302.3	6	153	135918	196
15	13	52236.4	52062.7	142.4	7	153	140553	244
15	14	51931.2	51928.8	2.0	8	153	140948	270
15	15	51834	51831.8	1.8	9	153	141555	318
15	16	51803.7	51809.5	-4.8	10	153	141940	344
15	17	51821.1	51803.8	14.2	11	153	142604	392
15	18	51808	51805.4	2.1	12	153	142943	418
16	7	51842.4	51844.8	-2.0	1	153	132946	24
16	8	51833.9	51855.9	-18.0	2	153	133301	46
16	9	51889.3	51883.1	5.1	3	153	133940	98
16	10	51941.7	51939.8	1.6	4	153	134227	120
16	11	52063.6	51999.9	52.2	5	153	134901	172
16	12	52082.9	52013.1	57.2	6	153	135905	194
16	13	52001.7	51955.2	38.1	7	153	140608	246
16	14	51886.4	51890.4	-3.3	8	153	140936	268
16	15	51839.1	51829.3	8.0	9	153	141606	320
16	16	51811.7	51810.3	1.1	10	153	141928	342
16	17	51831.9	51806	21.2	11	153	142615	394
16	18	51799	51806.8	-6.4	12	153	142931	416
17	7	51848.9	51849.4	-4	1	153	132958	26
17	8	51827.6	51860.8	-27.2	2	153	133248	44
17	9	51874.2	51878.6	-3.6	3	153	133953	100
17	10	51870.2	51898.8	-23.4	4	153	134212	118
17	11	51929.9	51917.1	10.5	5	153	134914	174
17	12	51915.4	51911.1	3.5	6	153	135848	192
17	13	51901.7	51879	18.6	7	153	140622	248
17	14	51849.7	51853	-2.7	8	153	140922	266
17	15	51837.7	51822.7	12.3	9	153	141620	322
17	16	51813.3	51812.6	.6	10	153	141916	340
17	17	51833	51809	19.7	11	153	142628	396
17	18	51819.5	51810.3	7.5	12	153	142920	414
18	7	51862.2	51865.2	-2.5	1	153	133010	28
18	8	51864.4	51885.8	-17.5	2	153	133235	42
18	9	51922.4	51907.5	12.2	3	153	134004	102
18	10	51860.2	51894.9	-28.4	4	153	134201	116
18	11	51880.2	51884.3	-3.4	5	153	134926	176
18	12	51855.8	51863.6	-6.4	6	153	135834	190
18	13	51857.6	51843	12.0	7	153	140637	250
18	14	51829.6	51832.2	-2.1	8	153	140910	264
18	15	51836.6	51816	16.9	9	153	141631	324
18	16	51819.6	51811	7.0	10	153	141905	338
18	17	51836.6	51810.3	21.6	11	153	142640	398
18	18	51817.1	51811.9	4.3	12	153	142908	412
19	7	51906	51891.6	11.8	1	153	133022	30

Appendix IIC: Magnetic Survey Data (Contd)

X Coord.	Y Coord.	Bottom Sensor nT	Top Sensor (nT)	Vertical Gradient (nT/m)	Line	Day	Time	Sta
19	8	51979.1	51933.8	37.1	2	153	133223	40
19	9	52125.4	51974.7	123.5	3	153	134016	104
19	10	51973.4	51932.8	33.3	4	153	134149	114
19	11	51890.8	51886.8	33	5	153	134937	178
19	12	51838.3	51847.1	-7.2	6	153	135819	188
19	13	51843.4	51829.5	11.4	7	153	140649	252
19	14	51820.9	51819.8	9	8	153	140858	262
19	15	51830	51809.9	16.5	9	153	141642	326
19	16	51818.6	51807.5	9.1	10	153	141852	336
19	17	51837.4	51808.9	23.4	11	153	142651	400
19	18	51824.3	51810	11.7	12	153	142854	410
20	7	51948.2	51909.8	31.5	1	153	133035	32
20	8	52106.8	51975.9	107.3	2	153	133208	38
20	9	52267.9	52010.7	210.8	3	153	134028	106
20	10	52087	51962.3	102.2	4	153	134134	112
20	11	51909.9	51890.1	16.2	5	153	134950	180
20	12	51834.7	51839	-3.5	6	153	135807	186
20	13	51840.5	51819.4	17.3	7	153	140700	254
20	14	51814.8	51810.9	32	8	153	140845	260
20	15	51830.9	51803.6	22.4	9	153	141654	328
20	16	51814.6	51802.5	9.9	10	153	141840	334
20	17	51833.2	51804.9	23.2	11	153	142703	402
20	18	51823.2	51806	14.1	12	153	142840	408
21	7	51926.6	51896.3	24.8	1	153	133049	34
21	8	52030.1	51950.1	65.6	2	153	133153	36
21	9	52107.6	51964.9	117.0	3	153	134041	108
21	10	51995.1	51933.2	50.7	4	153	134117	110
21	11	51896	51872.5	19.3	5	153	135001	182
21	12	51830.9	51830	.7	6	153	135756	184
21	13	51838.2	51810.5	22.7	7	153	140712	256
21	14	51807.3	51802	43	8	153	140833	258
21	15	51820.2	51794.9	20.7	9	153	141731	330
21	16	51809.1	51795.6	11.1	10	153	141827	332
21	17	51832.1	51799.1	27.0	11	153	142715	404
21	18	51819.7	51800.5	15.7	12	153	142824	406

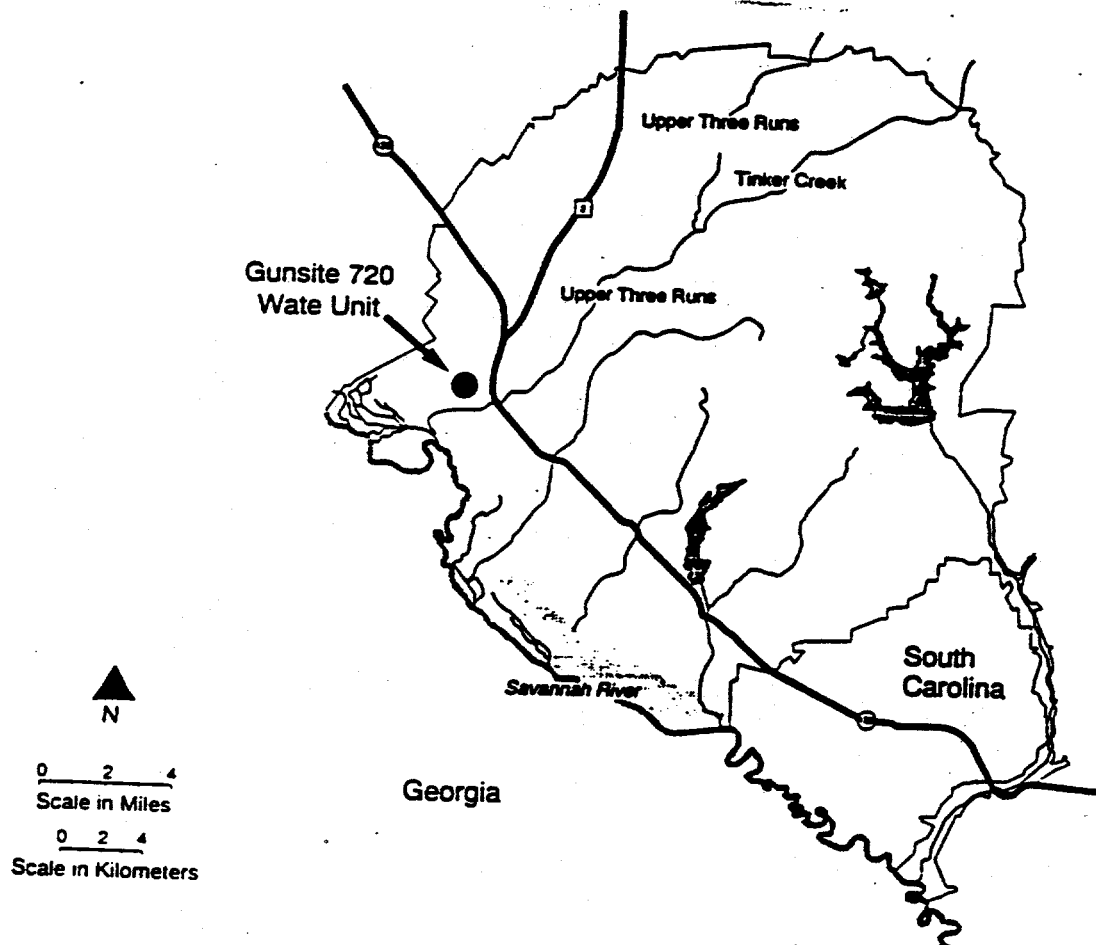
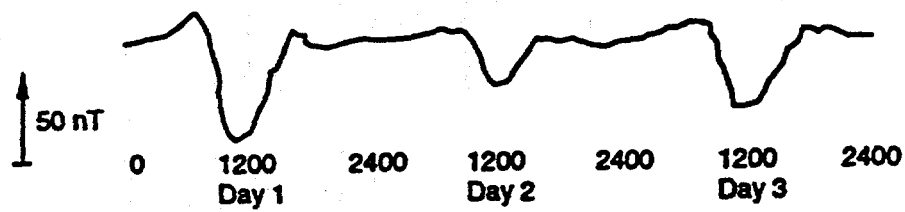
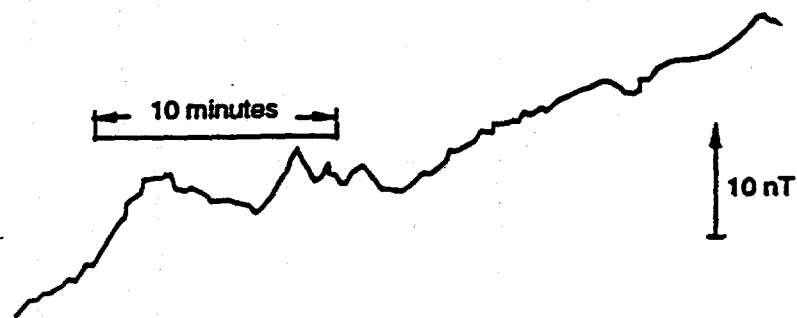


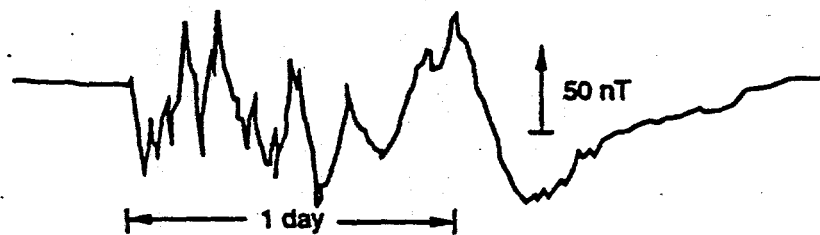
Figure 1. Location of Gunsite 720 Waste Unit



DIURNAL VARIATION



MICROPULSATIONS



MAGNETIC STORM

Figure 2. Typical temporal variations exhibited by the total magnetic field due to diurnal variation, micropulsations, and magnetic storms on the sun¹

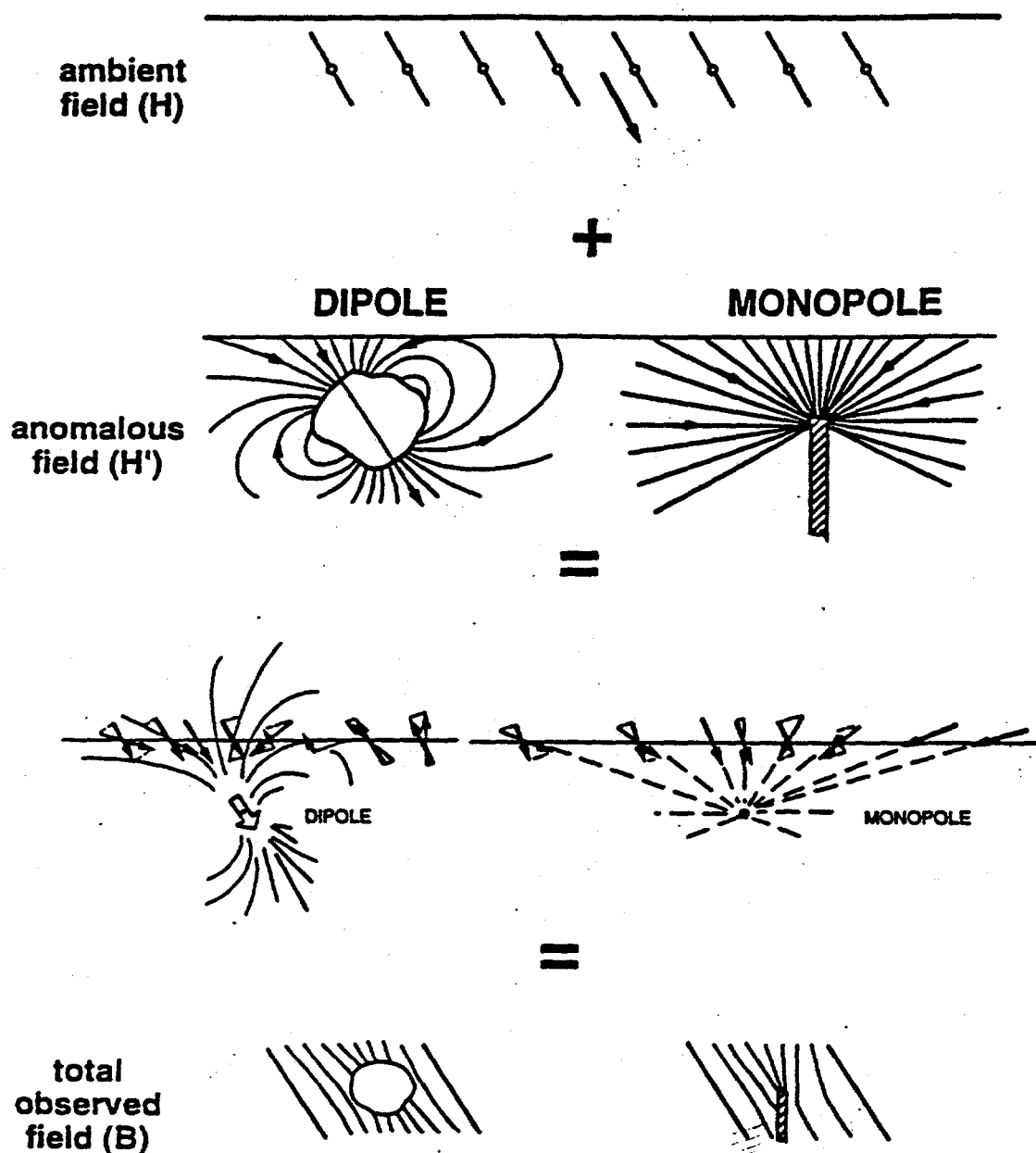


Figure 3. Superposition of the Earth's ambient magnetic field and anomalous fields produced by induced monopoles and dipoles to produce anomalies in the total field¹

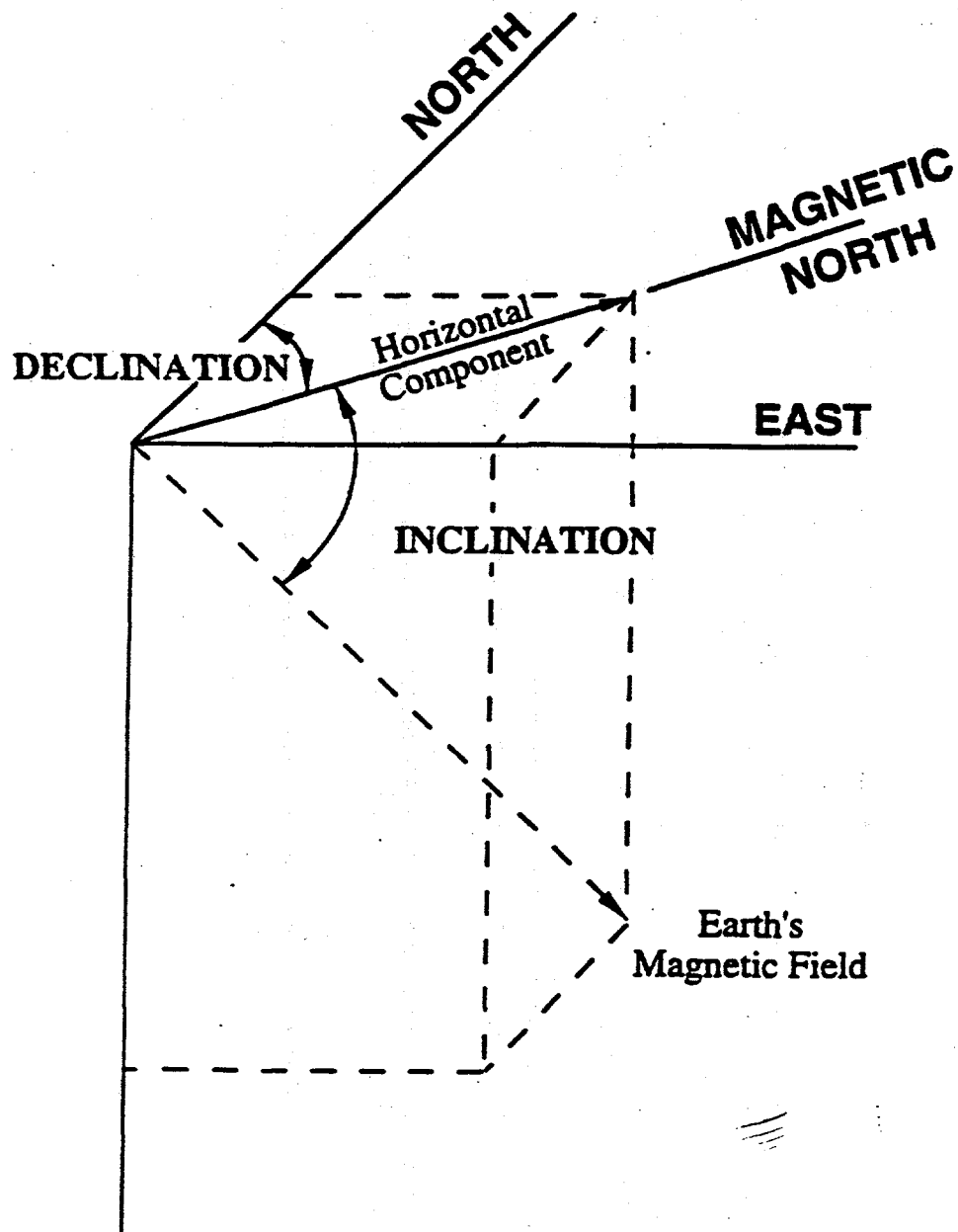


Figure 4. The relationship of magnetic inclination and declination to geographic directions on the Earth²

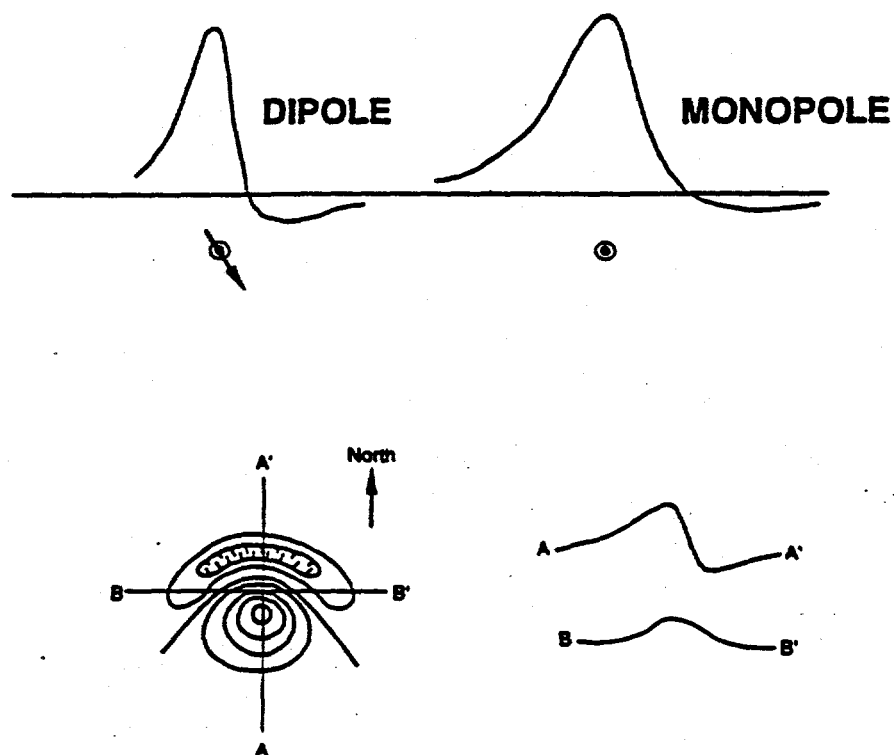


Figure 5. Typical profiles of magnetic field intensity across monopoles and dipoles, for conditions similar to SRS. Also shown is a contour representation of magnetic field intensity over a dipole with accompanying representative profiles.

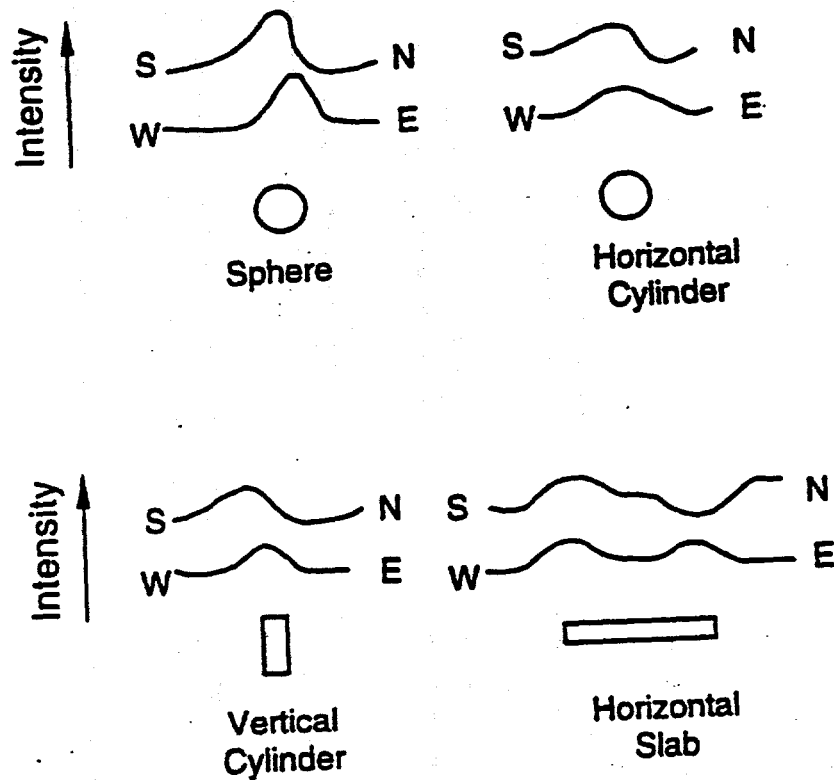


Figure 6. Magnetic intensity profiles across several geometric shapes of interest for magnetic field inclination similar to that of SRS (i.e., 60 degrees)¹

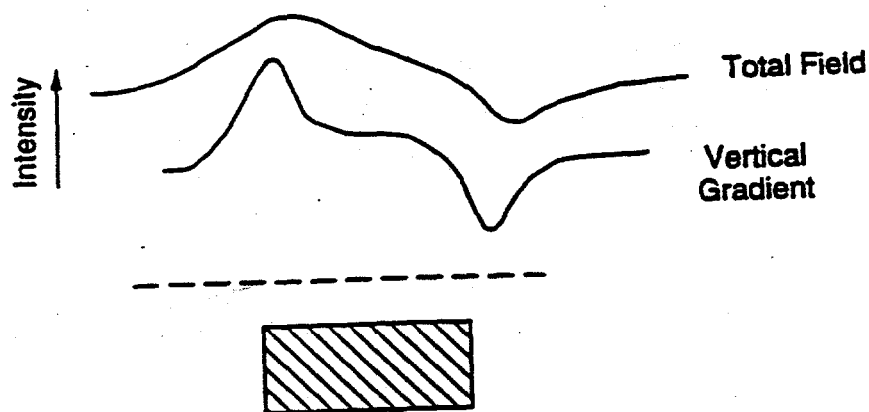


Figure 7. The intensity of the total magnetic field compared with the vertical gradient over a prismatic body

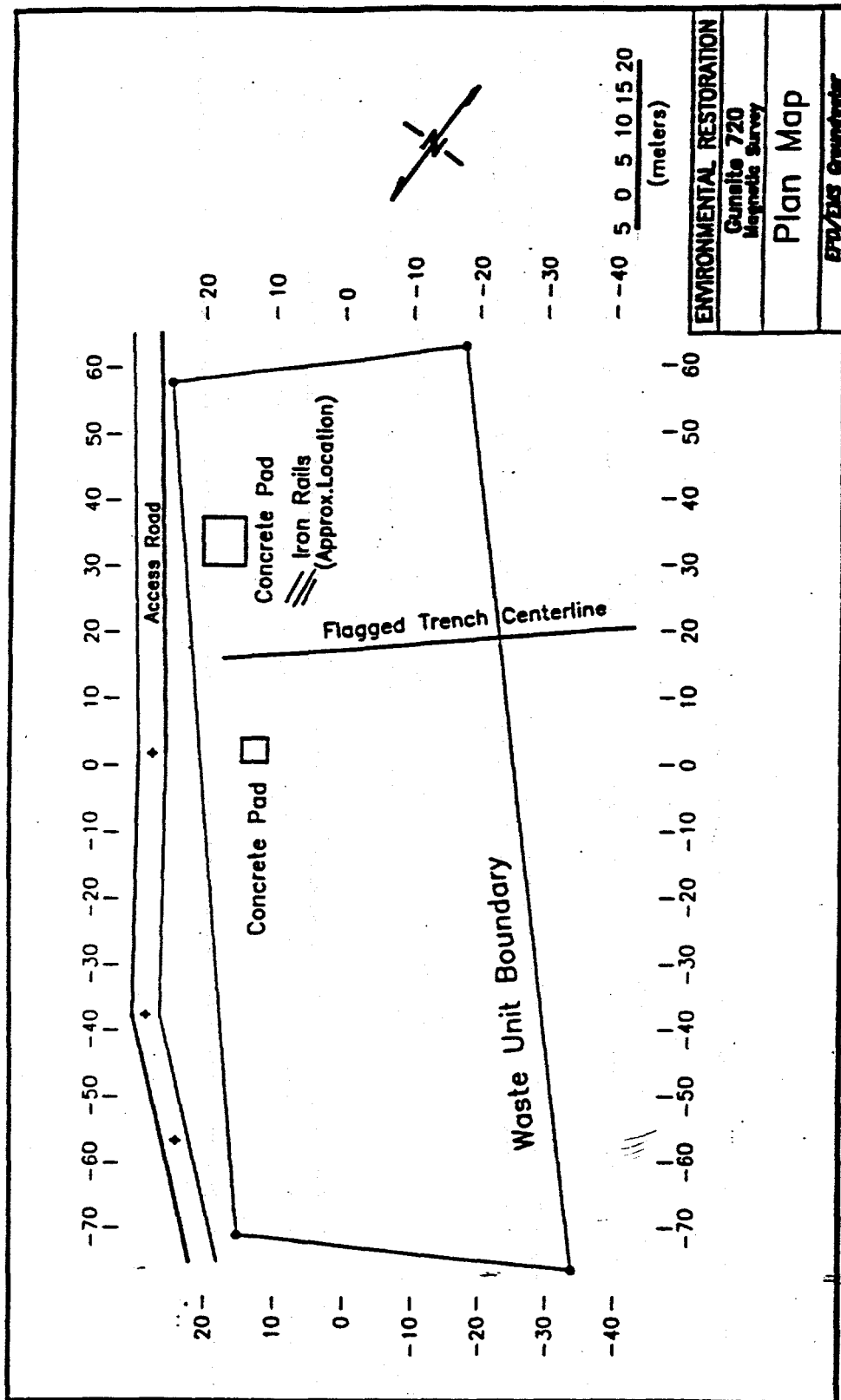


Figure 8. Planimetric map of Gunsite 720 Waste Unit¹

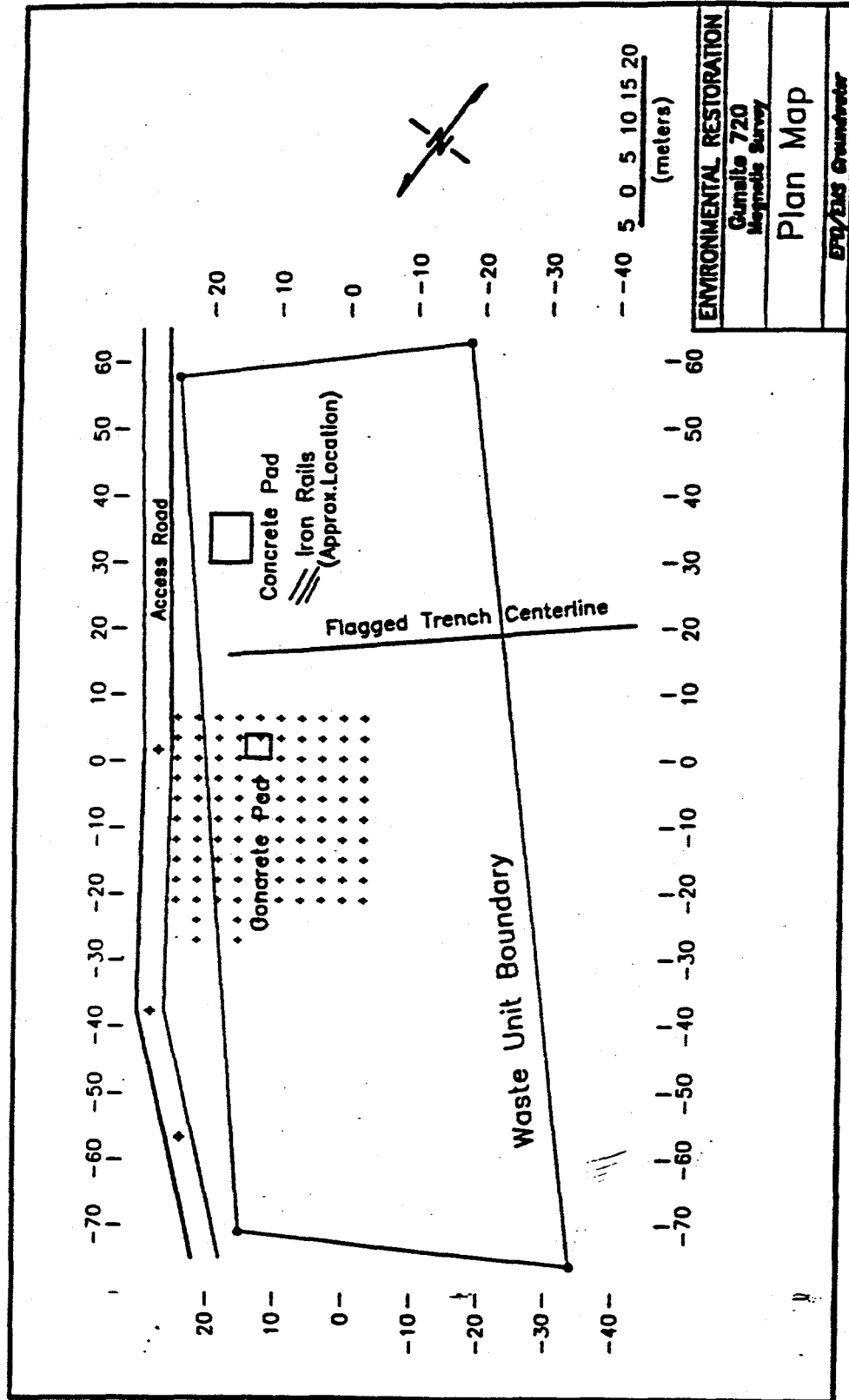


Figure 9. Station locations for 1986 magnetic survey of Gunsite 720 by Smith and Mims. Magnetic survey station locations marked by "+".

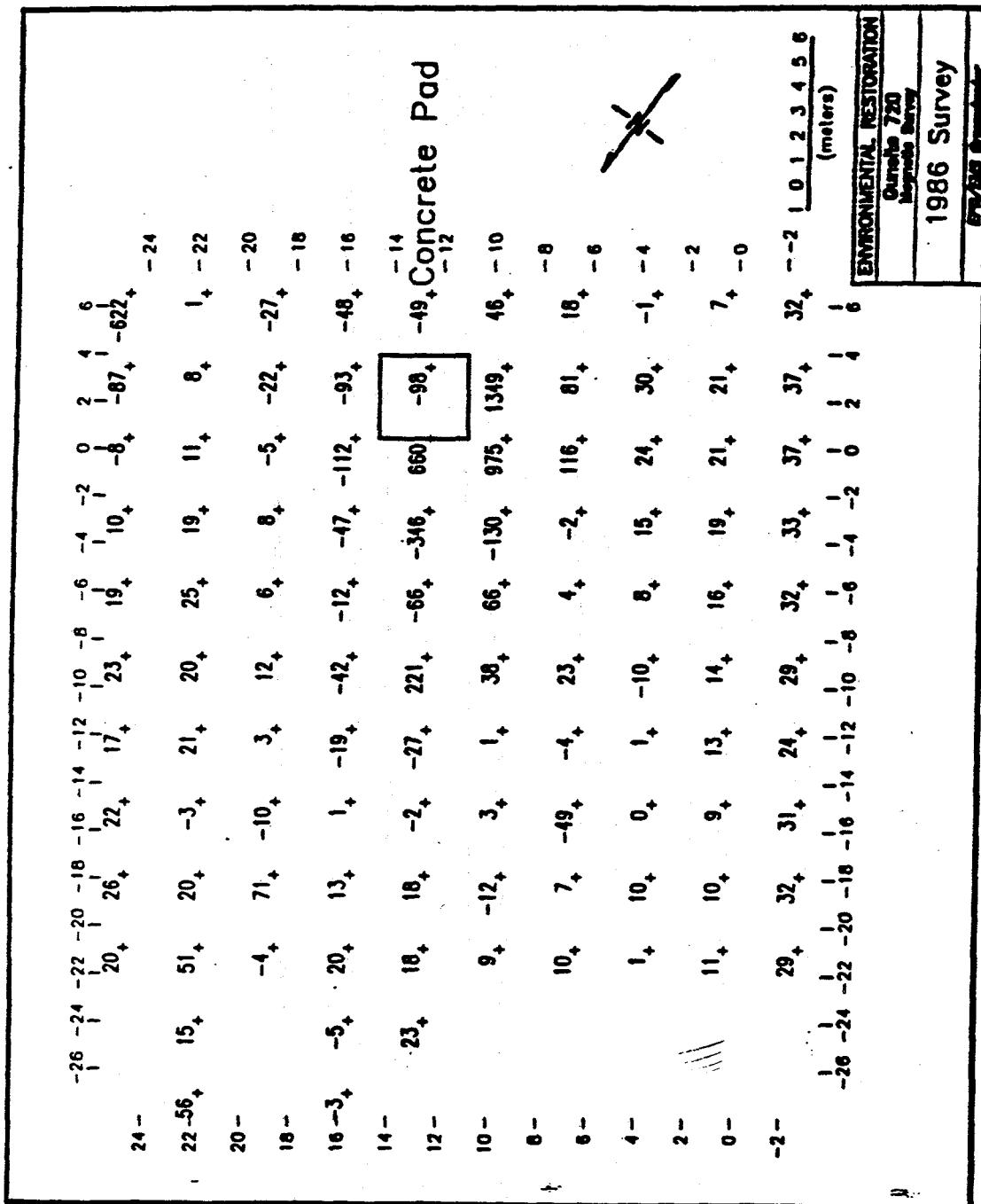


Figure 10a. The 1986 magnetic survey data (from Smith); grid spacing 10 ft.; 52420 nT subtracted from original data. Data values used for contour diagram.

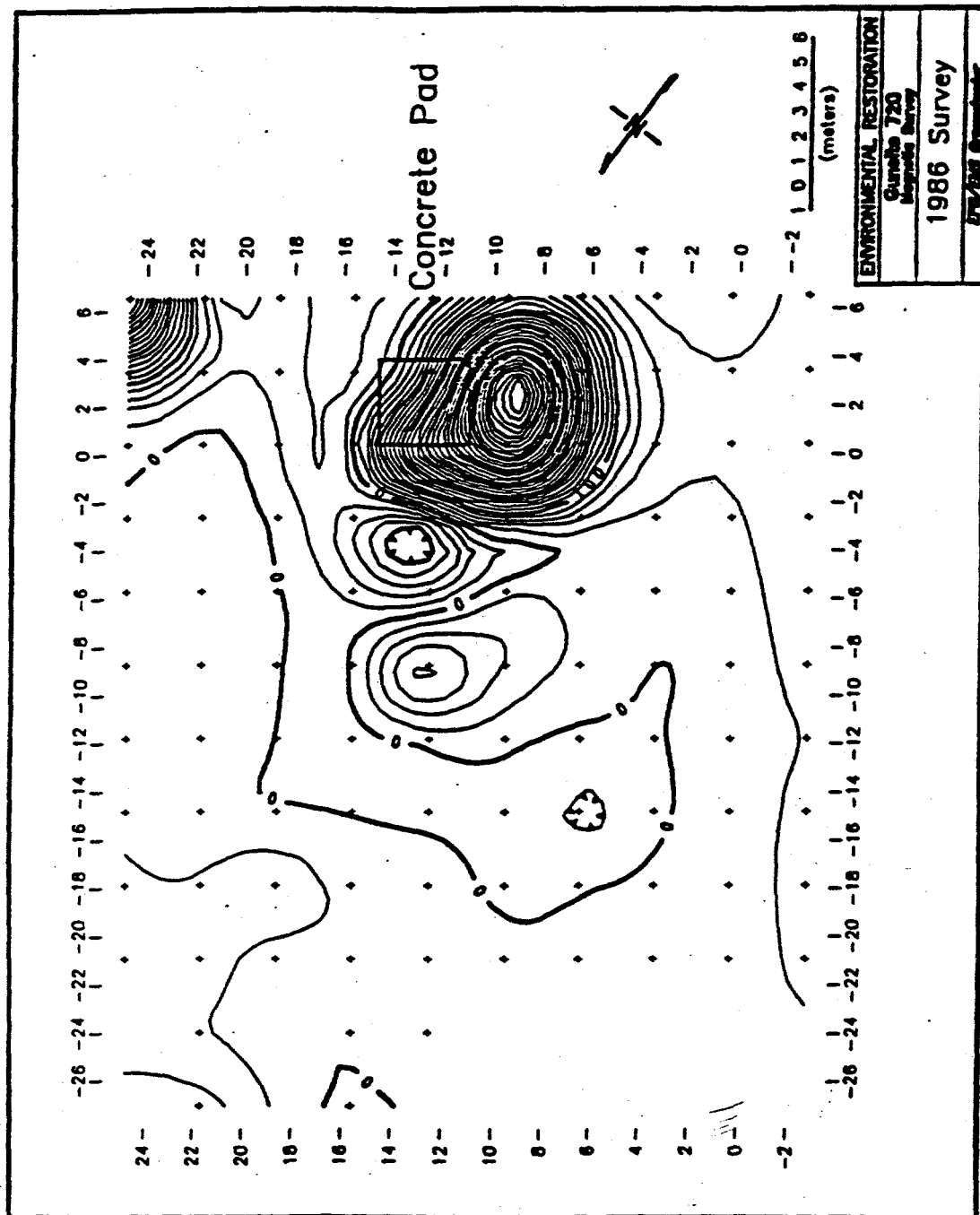


Figure 10b. Contoured grid with grid dimensions same as data collection; grid smoothed with three passes of Hanning filter before contouring

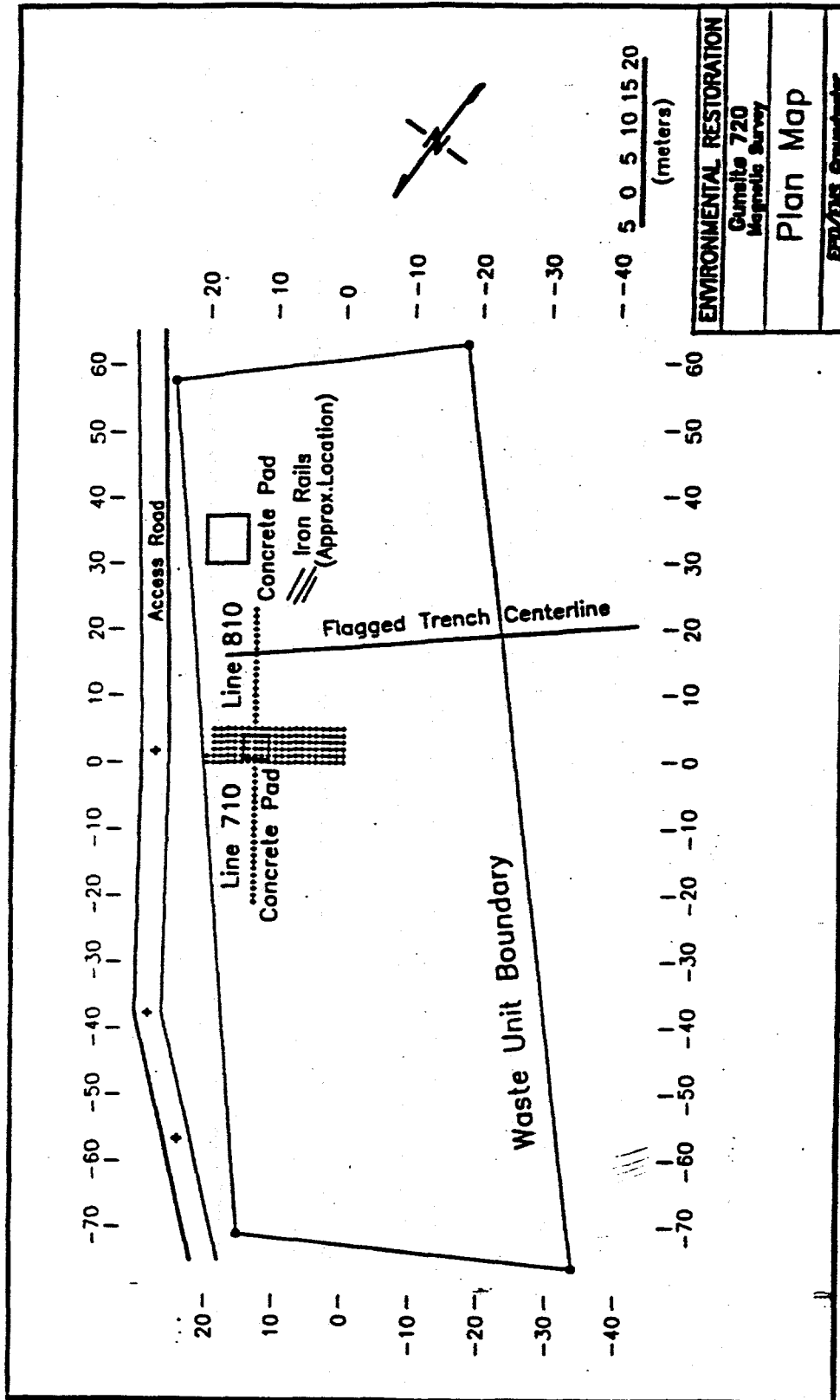


Figure 11. Station locations for Section I of the 1993 magnetic survey. Survey station locations marked by "+".

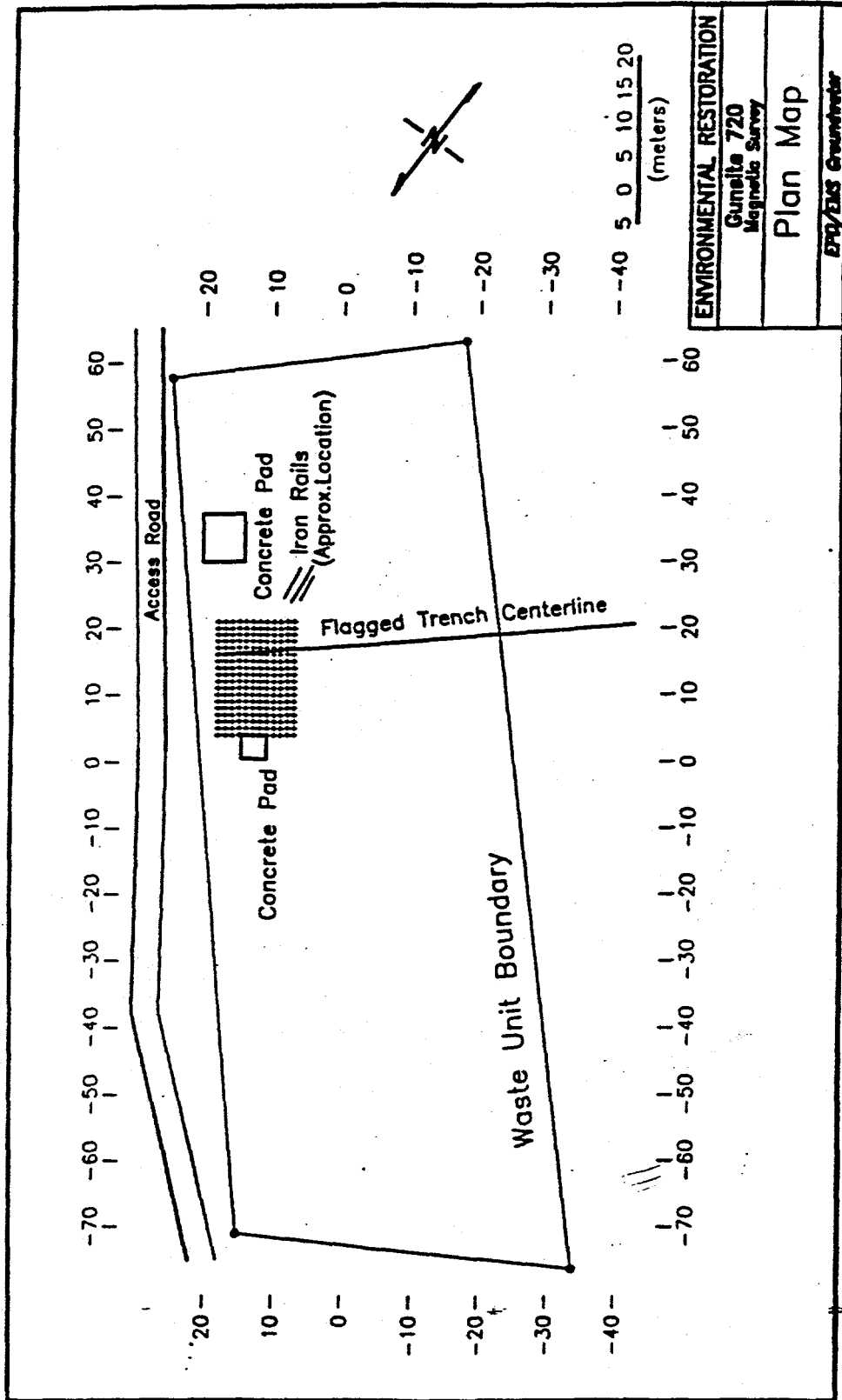


Figure 12. Station locations for Section II of the 1993 magnetic survey. Station locations marked by "x".

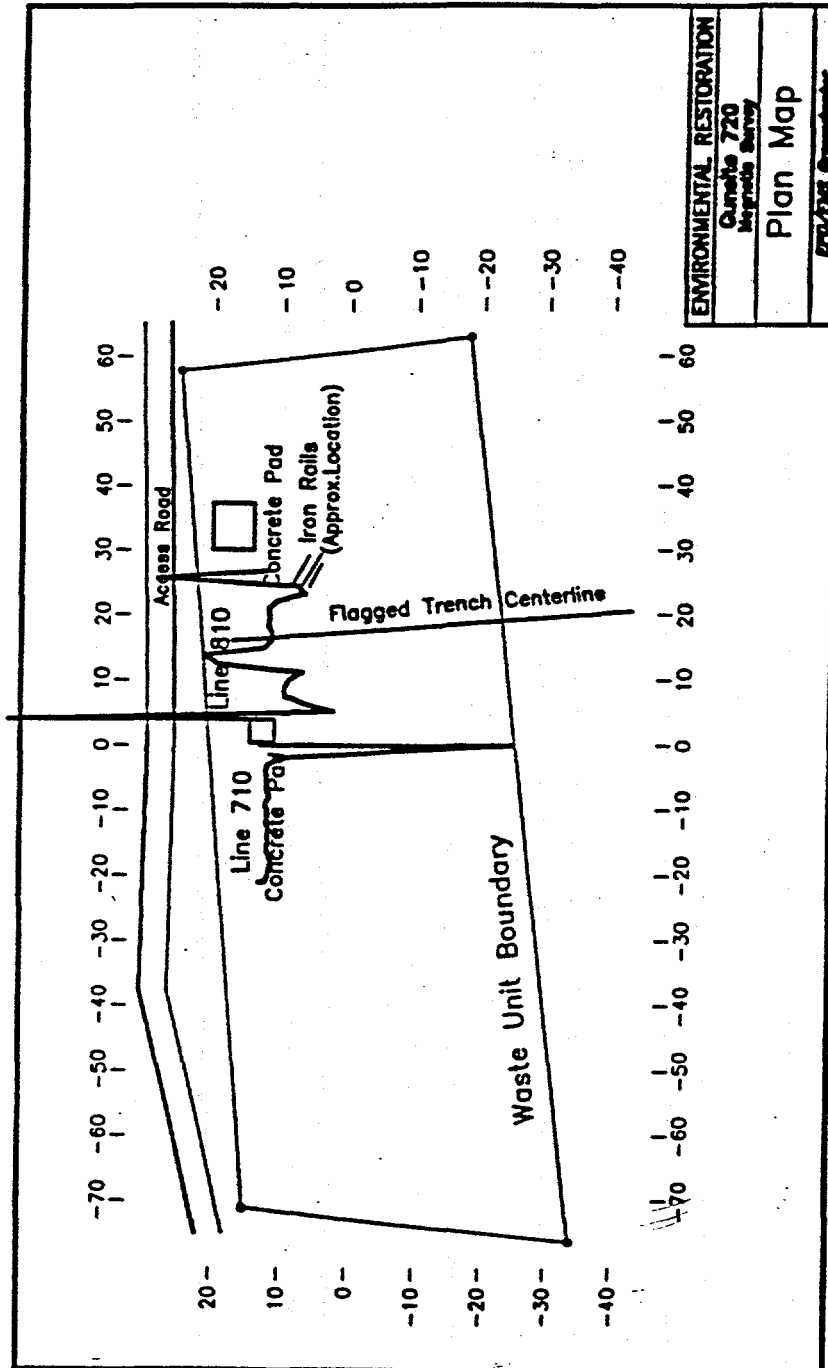


Figure 13. Line 710 and Line 810 vertical gradient profiles

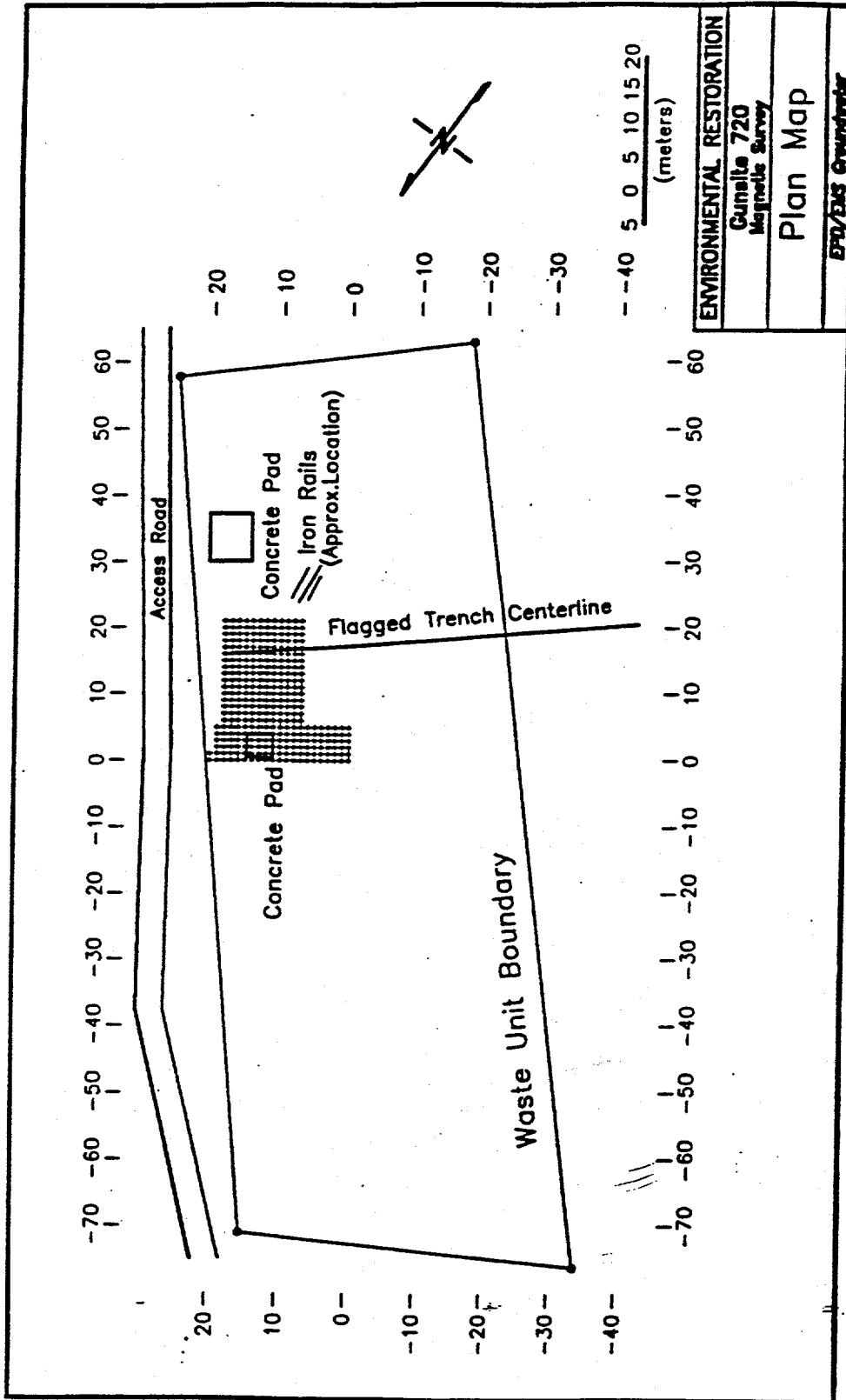


Figure 14. Station locations for Section I and Section II of the 1993 survey. Station locations marked by "+".

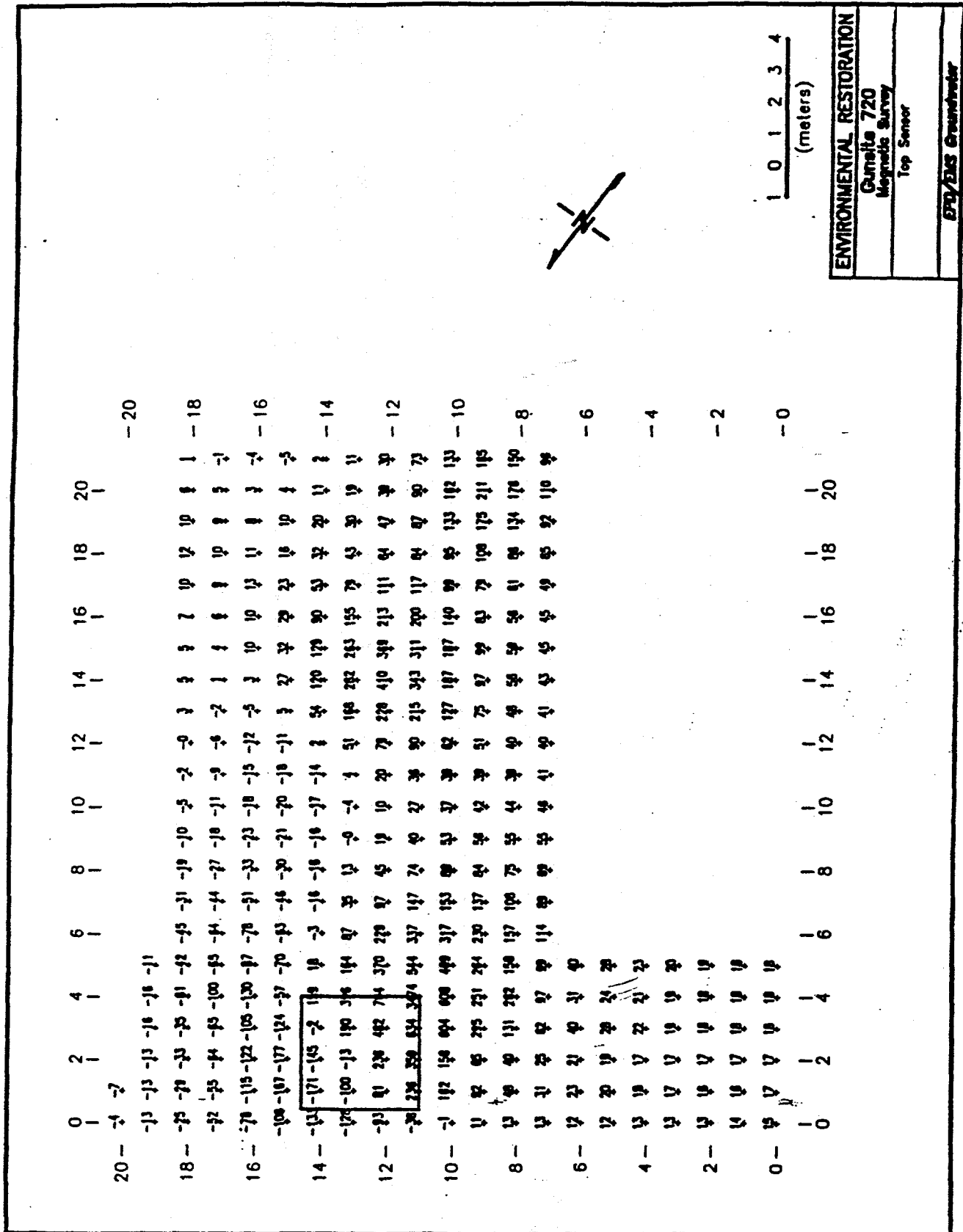


Figure 15a. Combined, diurnally corrected top sensor data set for sections I and II of the 1993 magnetic survey. Magnetic field values used for contour; total field -51800 nT.

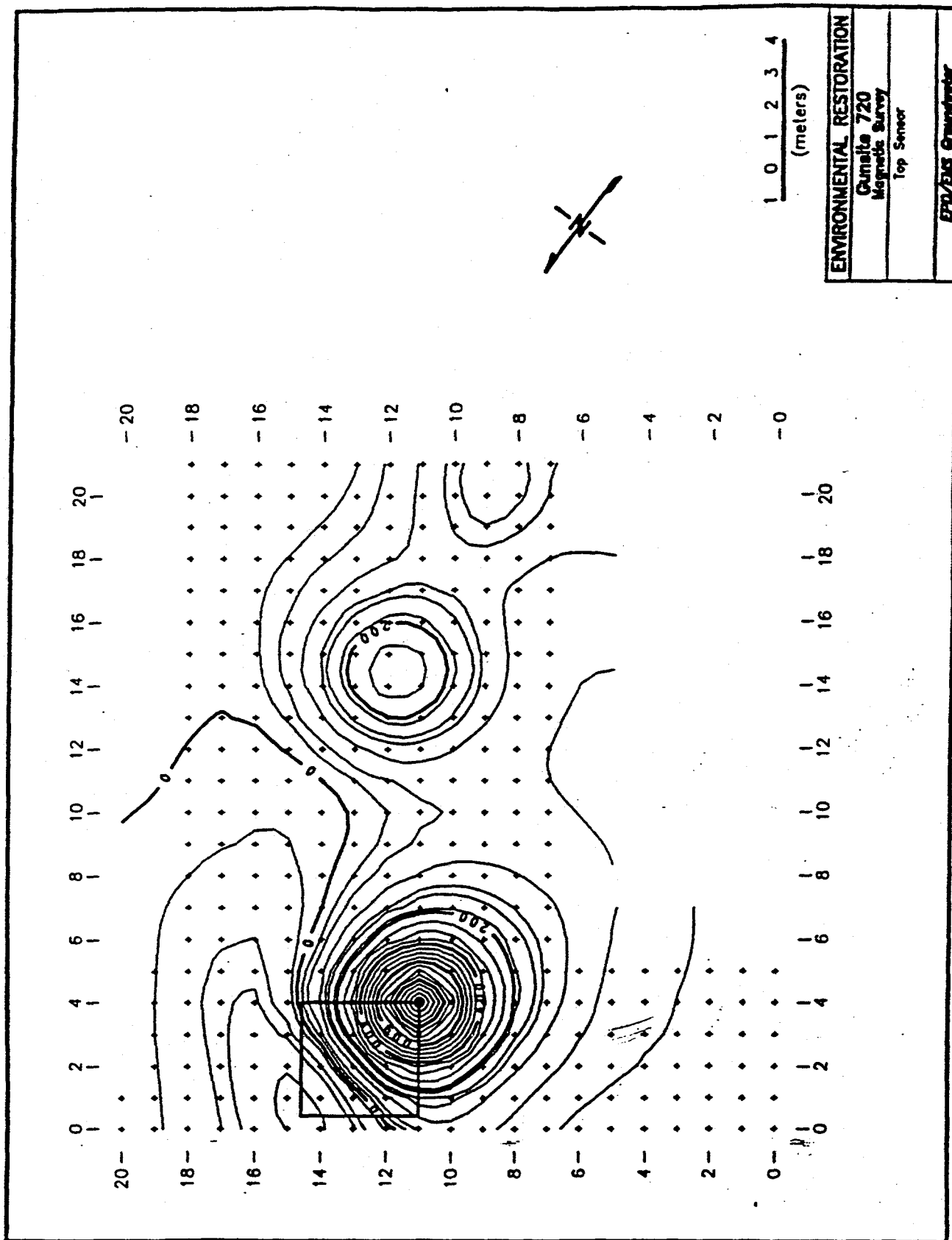


Figure 15b. Contoured representation of top sensor data; data smoothed by two passes of a Hanning filter before contouring

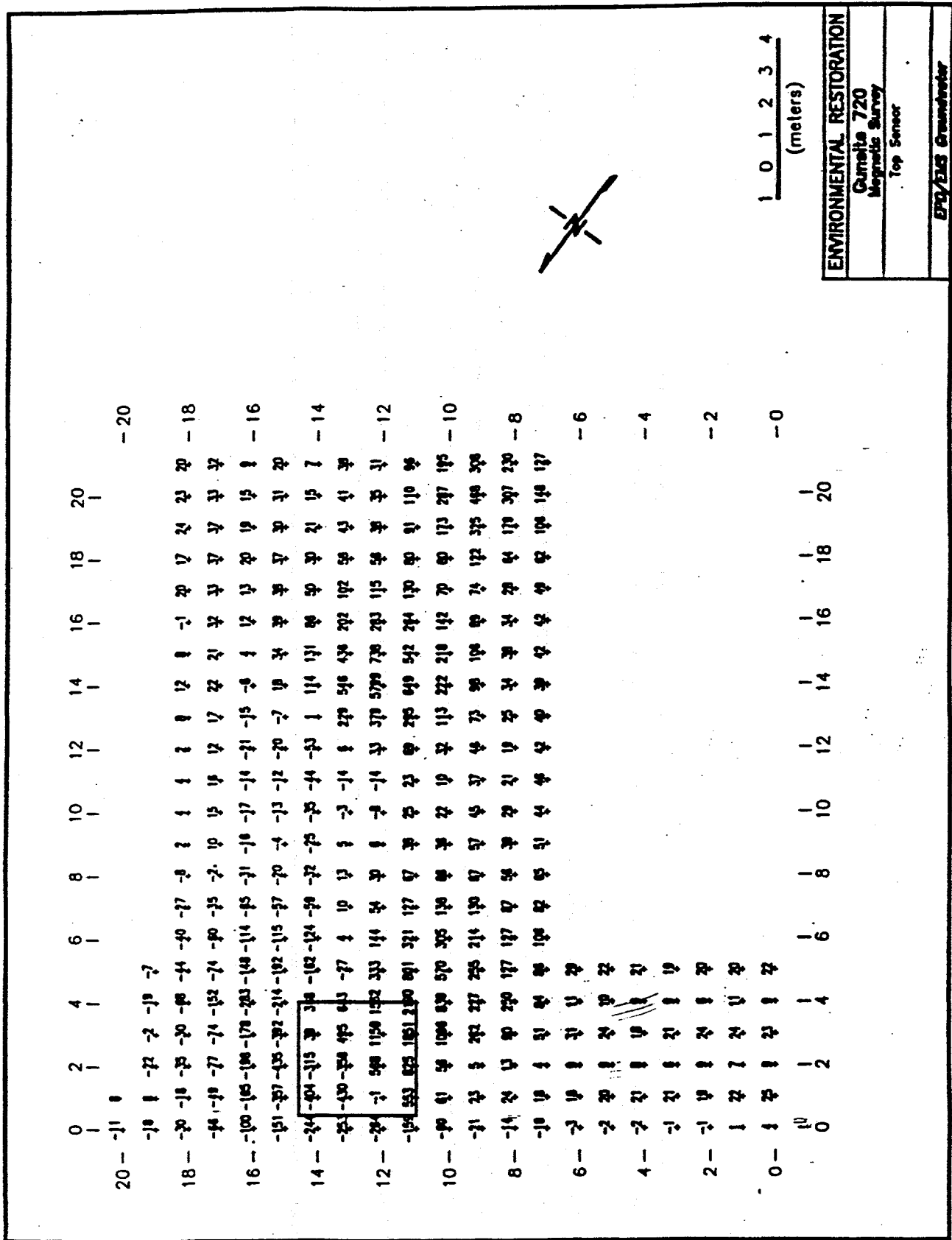


Figure 16a. Combined, diurnally corrected bottom sensor data set for sections I and II of the 1993 magnetic survey. Magnetic field values used for contour; total field -51800 nT.

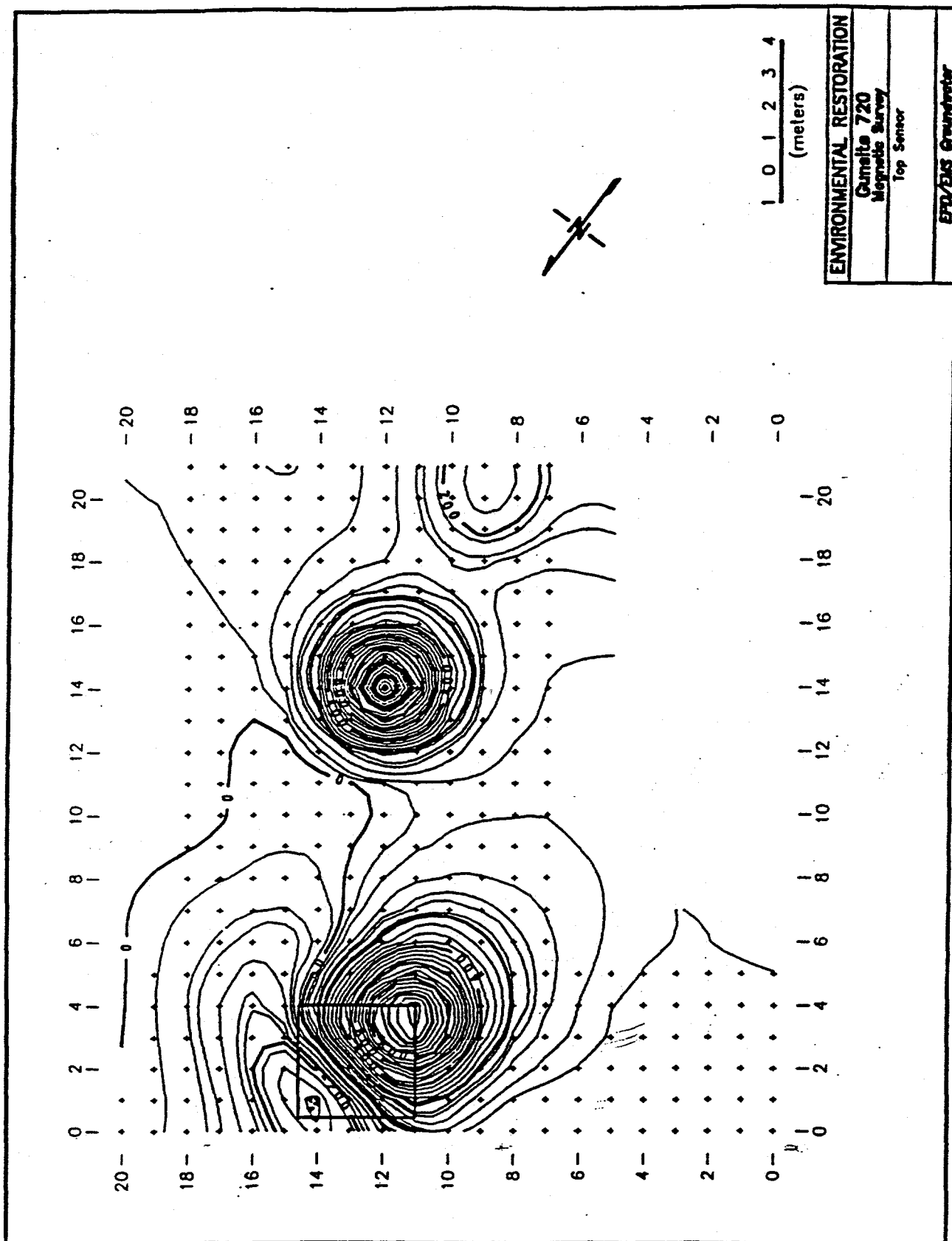


Figure 16b. Contoured representation of bottom sensor data; data smoothed by two passes of a Hanning filter before contouring

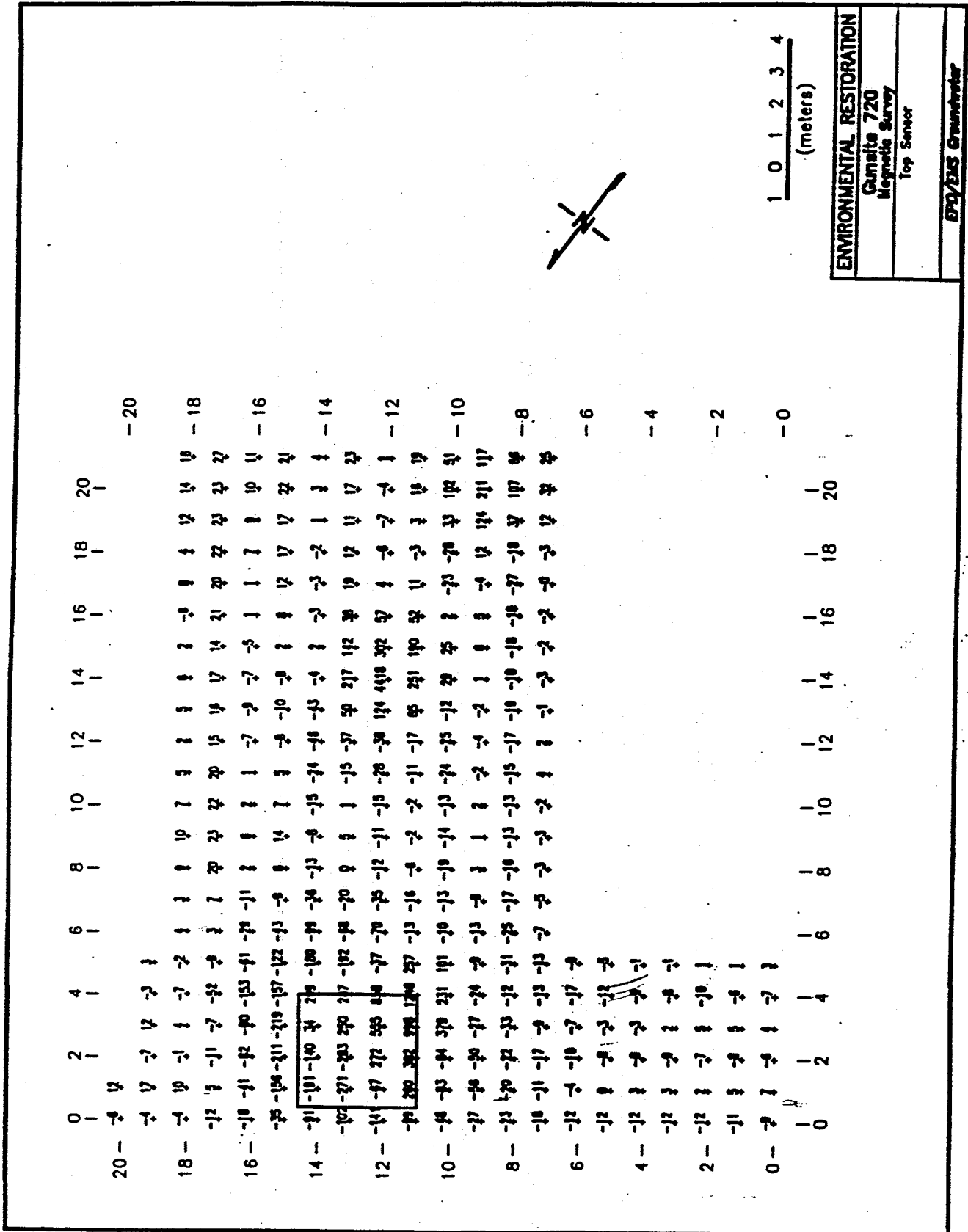


Figure 17a. Combined, diurnally corrected vertical gradient (bottom-top) data set for sections I and II of the 1993 magnetic survey. Vertical gradient values used for contour.

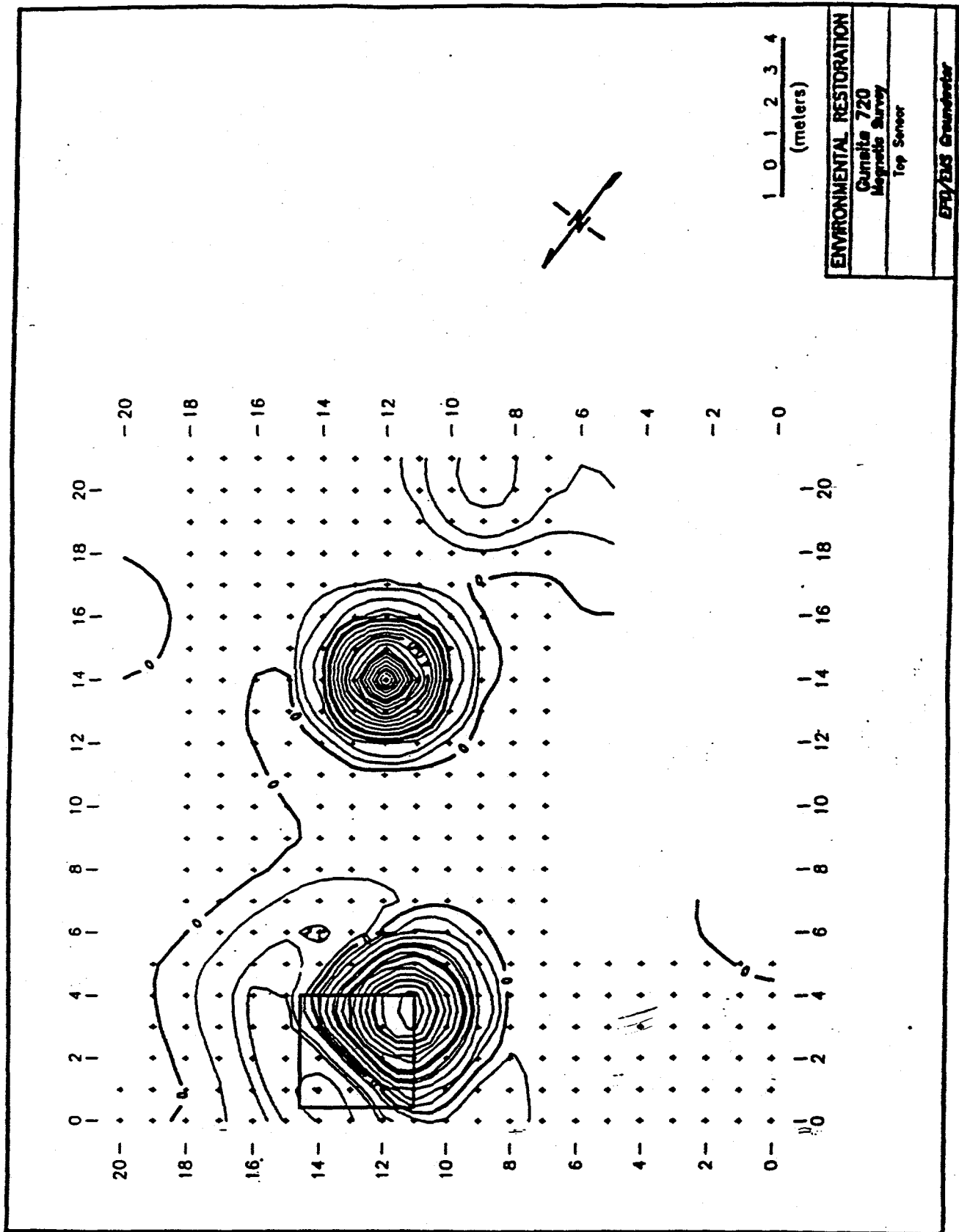


Figure 17b. Contoured representation of vertical gradient; data smoothed by two passes of a Hanning filter before contouring

APPENDIX B

ANALYTICAL DATA AND QA/QC EVALUATION RESULTS

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208 WELSH POOL ROAD
PICKERING CREEK INDUSTRIAL PARK
LIONVILLE, PA 19353
PHONE: (215) 524-7360
TELEX: 83-5348

14 May 1990

Mr. Howard Hickey
Westinghouse Savannah River Company
Building 740-3A
Aiken, SC 29808

Re: Analytical results for samples collected at Gunsite 720 (RFW
batches 9002L603 and 604)

Dear Mr. Hickey:

Enclosed are the analytical results for WSRC release order 13,
Gunsite 720. These results consist of an electronic data
deliverable, and a standard commercial report which includes a case
narrative summarizing QA/QC results.

If we can provide any further information, please feel free to
contact myself or Ben Shapiro.

Very truly yours,

ROY F. WESTON, INC.


Jack R. Tuschall
Laboratory Manager
Analytics Division

JRT/clk

Enclosure:

cc: Michelle Wilson
David Oliphant
Ben Shapiro

WESTON ANALYTICS
LIONVILLE, PA
DATA TRANSFER RECORD

SHEET 1 OF 1
DISK 1 OF 1

LIMS ☒
WALIS ☒
INITIAL ☒
CORRECTED ☐
OTHER ☐

CLIENT: WSRC GUNSITE 720

PROJECT MANAGER: BEN SHAPIRO

ELECTRONIC ☒
HARD COPY ☐

ANALYSIS	RFW #	FILE NAME	SITE	W.O. #
METALS	9002L603	W9002603.DAT	GUNSITE 720	0630-28-13
VOA				
BNA				
INORGANICS				
PHC				
RAD				
VOA	9002L604	W9002604.DAT	GUNSITE 720	0630-28-13
PEST/PCB				
BNA				
HERBICIDES				
TDF				
OP PEST				
INORGANICS				
METALS				

ELECTRONIC TRANSFER BY: *Robert J. Dondos* DATE OF TRANSFER: 5/10/90
HARD COPY TRANSFER BY: _____ DATE OF TRANSFER: _____
RECEIVED BY: _____ DATE OF TRANSFER: _____

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LVW028	02/13/90	N/A	02/24/90
LAB QC:						
VBLK	MB1	S	90LVW028	N/A	N/A	02/24/90

WESTON

**ROY F. WESTON, INC.
Lionville Laboratory**

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604, GC/MS VOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of one soil sample collected on 02-13-90.

The sample was analyzed according to criteria set forth in SW 846 Method 8240 for Appendix IX Volatile target compounds on 02-24-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were not detected in this sample.
2. All surrogate recoveries are within EPA QC limits.
3. The blank contains Methyl Chloride and Acetone at levels less than the CRQL.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-4-90
Date

RPM Batch Number: 9002L604

Roy F. Weston, Inc. - onville Laboratory
Volatiles by GC/MS, Appendix IX List
Client: MSRC GUNSITE 720

Report Date: 03/27/90 13:48
Work Order: 0630-28-13-0000
Page: 1A

Cust ID: GS720 01 02 VBLK

Sample Information

RPM#: 001 90LVM028-MB1
Matrix: SOIL SOIL
D.F.: 0.986 1.00
Units: ug/kg ug/kg

Surrogate	1,2-Dichloroethane-d4	102 %	99 %	101 %	96 %
Chloromethane		11 U	10 U		
Bromomethane		11 U	10 U		
Vinyl Chloride		11 U	10 U		
Chloroethane		11 U	10 U		
Methylene Chloride		10 B	8		
Acetone		26 B	13		
Carbon Disulfide		5 U	5 U		
1,1-Dichloroethane		5 U	5 U		
1,1-Dichloroethane		5 U	5 U		
1,2-Dichloroethane (total)		5 U	5 U		
Chloroform		5 U	5 U		
1,2-Dichloroethane		5 U	5 U		
2-Butanone		11 U	10 U		
1,1,1-Trichloroethane		5 U	5 U		
Carbon Tetrachloride		5 U	5 U		
Vinyl Acetate		11 U	10 U		
Bromodichloromethane		5 U	5 U		
1,2-Dichloropropane		5 U	5 U		
cis-1,3-Dichloropropene		5 U	5 U		
Trichloroethene		5 U	5 U		
Dibromochloromethane		5 U	5 U		
1,1,2-Trichloroethane		5 U	5 U		
Benzene		5 U	5 U		
Trans-1,3-Dichloropropene		5 U	5 U		
Bromoform		5 U	5 U		
4-Methyl-2-pentanone		11 U	3 J		
2-Hexanone		11 U	5 J		
Tetrachloroethene		5 U	5 U		
1,1,2,2-Tetrachloroethane		5 U	5 U		

* = Outside of EPA CLP GC limits.

Cust ID: G8720 01 02

VEIK

RTW#:

001

90LVM028-MB1

Toluene	5	U	5	U
Chlorobenzene	5	U	5	U
Ethylbenzene	5	U	5	U
Styrene	5	U	5	U
Xylene (total)	5	U	5	U
Acrolein	11	U	10	U
Acrylonitrile	11	U	10	U
Trichlorofluoromethane	2	J	5	U
Dichlorodifluoromethane	11	U	10	U
Acetonitrile	21	U	20	U
Iodomethane	11	U	10	U
Propionitrile (Ethyl Cyanide)	54	U	50	U
3-chloropropene	21	U	20	U
Methacrylonitrile	21	U	20	U
Dibromomethane	11	U	10	U
Isobutyl alcohol	21	U	20	U
1,2-Dibromomethane	21	U	20	U
1,1,1,2-Tetrachloroethane	11	U	10	U
1,2,3-Trichloropropene	11	U	10	U
trans-1,4-Dichloro-2-butene	54	U	50	U
1,2-Dibromo-3-chloropropene	21	U	20	U
2-chloro-1,3-Butadiene	110	U	100	U

* = Outside of EPA CLP GC limits.



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC - GUNSITE 720

SAMPLES RECEIVED: 02-16-90

RFW #: 9002L604, GC/MS SEMIVOLATILE

W.O. #: 0630-28-13

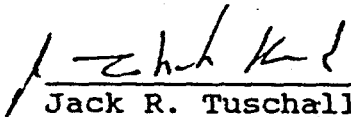
NARRATIVE

The set of samples consisted of one soil sample collected on 02-13-90.

The sample was extracted on 02-26-90 and analyzed according to criteria set forth in Method 8270 for Appendix IX Semivolatile target compounds on 03-07-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were detected in these samples.
2. All surrogate, matrix and blank spike recoveries are within EPA QC limits.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-16-90
Date

sma/cn/02-604b.cn

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- A = Aldol Condensation Product.
- X = Additional qualifiers used as required are explained in the case narrative.
- NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not applicable.
- DF = Dilution factor.
- NR = Not required.

Cust ID: GS720 01 02 GS720 01 02 GS720 01 02 SBLK SBLK BS

Sample Information

RFW#:	001	001 REP	001 MS	90LE0272-MB1	90LE0272-MB1
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.11	1.11	1.11	1.11	1.11
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

Surrogate Recovery	Nitrobenzene-d5	56	47	48	68	68
	2-Fluorobiphenyl	63	57	57	76	75
	p-Terphenyl-d14	73	71	70	91	87
	Phenol-d5	68	56	61	71	78
	2-Fluorophenol	60	49	51	55	64
	2,4,6-Tribromophenol	57	50	56	42	59

Phenol	390	400	63	370	81
bis(2-Chloroethyl) ether	390	400	380	370	370
2-Chlorophenol	390	400	57	370	74
1,3-Dichlorobenzene	390	400	380	370	370
1,4-Dichlorobenzene	390	400	50	370	74
Benzyl alcohol	390	400	380	370	370
1,2-Dichlorobenzene	390	400	380	370	370
2-Methylphenol	390	400	380	370	370
bis(2-Chloroisopropyl) ether	390	400	380	370	370
4-Methylphenol	390	400	380	370	370
N-Nitroso-Di-n-propylamine	390	400	46	370	63
Hexachloroethane	390	400	380	370	370
Nitrobenzene	390	400	380	370	370
Isophorone	390	400	380	370	370
2-Nitrophenol	390	400	380	370	370
2,4-Dimethylphenol	390	400	380	370	370
Benzoic acid	2000	2000	1900	1800	1800
bis(2-Chloroethoxy)methane	390	400	380	370	370
2,4-Dichlorophenol	390	400	380	370	370
1,2,4-Trichlorobenzene	390	400	60	370	88
Naphthalene	390	400	380	370	370
4-Chloroaniline	390	400	380	370	370
Hexachlorobutadiene	390	400	380	370	370
4-Chloro-3-methylphenol	390	400	61	370	76
2-Methylnaphthalene	390	400	380	370	370
Hexachlorocyclopentadiene	390	400	380	370	370

* = Outside of EPA CLP GC limits.

RFW#:	001	001 REP	001 MS	90LE0272-MB1	90LE0272-MB1
2,4,6-Trichlorophenol	390 U	400 U	380 U	370 U	370 U
2,4,5-Trichlorophenol	2000 U	2000 U	1900 U	1800 U	1800 U
2-Chloronaphthalene	390 U	400 U	380 U	370 U	370 U
2-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
Dimethylphthalate	390 U	400 U	380 U	370 U	370 U
Acenaphthylene	390 U	400 U	380 U	370 U	370 U
2,6-Dinitrotoluene	390 U	400 U	380 U	370 U	370 U
3-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
Acenaphthene	390 U	400 U	71 U	370 U	94 U
2,4-Dinitrophenol	2000 U	2000 U	1900 U	1800 U	1800 U
4-Nitrophenol	2000 U	2000 U	80 U	1800 U	106 U
Dibenzofuran	390 U	400 U	380 U	370 U	370 U
2,4-Dinitrotoluene	390 U	400 U	60 U	370 U	78 U
Diethylphthalate	390 U	400 U	380 U	370 U	370 U
4-Chlorophenyl-phenylether	390 U	400 U	380 U	370 U	370 U
Fluorene	390 U	400 U	380 U	370 U	370 U
4-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
4,6-Dinitro-2-methylphenol	2000 U	2000 U	1900 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	390 U	400 U	380 U	370 U	370 U
4-Bromophenyl-phenylether	390 U	400 U	380 U	370 U	370 U
Hexachlorobenzene	390 U	400 U	380 U	370 U	370 U
Pentachlorophenol	2000 U	2000 U	77 U	1800 U	95 U
Phenanthrene	390 U	400 U	380 U	370 U	370 U
Anthracene	390 U	400 U	380 U	370 U	370 U
Di-n-Butylphthalate	390 U	400 U	380 U	370 U	370 U
Fluoranthene	390 U	400 U	380 U	370 U	370 U
Pyrene	390 U	400 U	90 U	370 U	113 U
Butylbenzylphthalate	390 U	400 U	380 U	370 U	370 U
3,3'-Dichlorobenzidine	780 U	790 U	750 U	740 U	740 U
Benzo(a)anthracene	390 U	400 U	380 U	370 U	370 U
Chrysene	390 U	400 U	380 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	39 J	400 U	380 U	370 U	370 U
Di-n-Octyl phthalate	390 U	400 U	380 U	370 U	370 U
Benzo(b)fluoranthene	390 U	400 U	380 U	370 U	370 U
Benzo(k)fluoranthene	390 U	400 U	380 U	370 U	370 U
Benzo(a)pyrene	390 U	400 U	380 U	370 U	370 U
Indeno(1,2,3-cd)pyrene	390 U	400 U	380 U	370 U	370 U
Dibenzo(a,h)anthracene	390 U	400 U	380 U	370 U	370 U
Benzo(g,h,i)perylene	390 U	400 U	380 U	370 U	370 U
1,4-Dioxane	390 U	400 U	380 U	370 U	370 U

* Outside of EPA CLP GC Limits.

RTW#:	001	001 REP	001 MS	90LE0272-NB1	90LE0272-NB1
Methyl methacrylate	390 U	400 U	380 U	370 U	370 U
Pyridine	390 U	400 U	380 U	370 U	370 U
N-Nitrosodimethylamine	390 U	400 U	380 U	370 U	370 U
Ethyl methacrylate	390 U	400 U	380 U	370 U	370 U
2-Picoline	390 U	400 U	380 U	370 U	370 U
N-Nitrosomethylethylamine	390 U	400 U	380 U	370 U	370 U
Methyl methanesulfonate	390 U	400 U	380 U	370 U	370 U
N-Nitrosodiethylamine	390 U	400 U	380 U	370 U	370 U
Ethyl methanesulfonate	390 U	400 U	380 U	370 U	370 U
Aniline	390 U	400 U	380 U	370 U	370 U
Pentachloroethane	390 U	400 U	380 U	370 U	370 U
3-Methylphenol	390 U	400 U	380 U	370 U	370 U
N-Nitrosopyrrolidine	390 U	400 U	380 U	370 U	370 U
Acetophenone	390 U	400 U	380 U	370 U	370 U
N-Nitrosomorpholine	390 U	400 U	380 U	370 U	370 U
O-Toluidine	390 U	400 U	380 U	370 U	370 U
N-Nitrosopiperidine	2000 U	2000 U	1900 U	1800 U	1800 U
N,N-Dimethylphenethylamine	390 U	400 U	380 U	370 U	370 U
2,6-Dichlorophenol	390 U	400 U	380 U	370 U	370 U
Hexachloropropene	390 U	400 U	380 U	370 U	370 U
p-Phenylenediamine	390 U	400 U	380 U	370 U	370 U
N-Nitroso-di-n-butylamine	390 U	400 U	380 U	370 U	370 U
Bafole	390 U	400 U	380 U	370 U	370 U
1,2,4,5-Tetrachlorobenzene	390 U	400 U	380 U	370 U	370 U
Isoafole	390 U	400 U	380 U	370 U	370 U
1,4-Naphthoquinone	390 U	400 U	380 U	370 U	370 U
1,3-Dinitrobenzene	390 U	400 U	380 U	370 U	370 U
Pentachlorobenzene	390 U	400 U	380 U	370 U	370 U
1-Naphthylamine	390 U	400 U	380 U	370 U	370 U
2-Naphthylamine	390 U	400 U	380 U	370 U	370 U
2,3,4,6-Tetrachlorophenol	390 U	400 U	380 U	370 U	370 U
1,3,5-Trinitrobenzene	390 U	400 U	380 U	370 U	370 U
Diallylate	390 U	400 U	380 U	370 U	370 U
Phenacetin	390 U	400 U	380 U	370 U	370 U
Diphenylamine	390 U	400 U	380 U	370 U	370 U
5-Nitro-o-toluidine	390 U	400 U	380 U	370 U	370 U
4-Aminobiphenyl	390 U	400 U	380 U	370 U	370 U
Pronamide	390 U	400 U	380 U	370 U	370 U
2-sec-Butyl-4,6-dinitrophenol	2000 U	2000 U	1900 U	1800 U	1800 U
Pentachloronitrobenzene	2000 U	2000 U	1900 U	1800 U	1800 U

* Outside of EPA CLP GC limits.

RFM#:	001	001 REP	001 MS	90LE0272-MB1	90LE0272-MB1
4-Nitroquinoline-1-oxide	780 U	790 U	750 U	740 U	740 U
Methapyrillene	390 U	400 U	380 U	370 U	370 U
Aramite	780 U	790 U	750 U	740 U	740 U
Chlorobenzilate	390 U	400 U	380 U	370 U	370 U
p-Dimethylaminobenzene	390 U	400 U	380 U	370 U	370 U
3,3'-Dimethylbenzidine	390 U	400 U	380 U	370 U	370 U
2-Acetylaminofluorene	390 U	400 U	380 U	370 U	370 U
7,12-Dimethylbenz(a)anthracene	390 U	400 U	380 U	370 U	370 U
Hexachlorophene	3500 U	3600 U	3400 U	3300 U	3300 U
3-Methylcholanthrene	390 U	400 U	380 U	370 U	370 U

(1) - Cannot be separated from Diphenylamine. * - Outside of EPA CLP GC limits.

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01 02

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L604-001

Sample wt/vol: 30.8 (g/mL) G

Lab File ID: M030707

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.37	300	JA
2.	ALDOL CONDENSATE	5.85	2000	JAB
3.	ALDOL CONDENSATE	6.55	900	JAB
4.	ALDOL CONDENSATE	7.57	500	JA
5.	UNKNOWN	19.17	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01 02REP

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L604-001 REP

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: M030709

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.32	200	J
2.	ALDOL CONDENSATE	5.82	1000	JAB
3.	ALDOL CONDENSATE	6.52	600	JAB
4.	ALDOL CONDENSATE	7.55	300	JA
5.	UNKNOWN	19.17	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

002872

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

SHLK

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 90LE0272-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: M030713

Level: (low/med) LOW

Date Received: 02/26/90

% Moisture: not dec. 0 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.78	1000	JA
2.	ALDOL CONDENSATE	6.52	1000	JA
3.	UNKNOWN	7.30	200	J
4.	UNKNOWN	9.02	200	J
5.	ADIPATE	22.22	200	J

GLOSSARY OF PEST/PCB DATA**DATA QUALIFIERS**

- U - Indicates that the compounds was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J - Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

RFW Ch Number: 90021604

Koy Y. Weston, Inc. - Lionville Laboratory
Pesticide/PCBs GC, Appendix IX List
Client: MSRC GUNSITE 720

Work Order: 0630-28-13-0000
Report Date: 04/20 12:00
Page: 1

Cust ID: GS720 01 02 GS720 01 02 GS720 01 02

PHLK

PHLK BS

Sample Information	RFW#:	001	001 REP	001 MS	90LE0272-MB2	90LE0272-MB2
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate: Di-n-butylchlorodendate		175 *	128 *	162 *	158 *	184 *
Alpha-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U
Beta-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U
Delta-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U
gamma-BHC (Lindane)		8.4 U	8.6 U	62 *	8.0 U	140 *
Heptachlor		8.4 U	8.6 U	75 *	8.0 U	85 *
Aldrin		8.4 U	8.6 U	60 *	8.0 U	88 *
Heptachlor epoxide		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U
Endosulfan I		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U
Dieldrin		17 U	17 U	66 *	16 U	92 *
4,4'-DDE		17 U	17 U	16 U	16 U	16 U
Endrin		17 U	17 U	76 *	16 U	114 *
Endosulfan II		17 U	17 U	16 U	16 U	16 U
4,4'-DDD		17 U	17 U	16 U	16 U	16 U
Endosulfan sulfate		17 U	17 U	16 U	16 U	16 U
4,4'-DDT		17 U	4.3 J	95 *	16 U	143 *
Methoxychlor		84 U	86 U	81 U	80 U	80 U
Endrin aldehyde		17 U	17 U	16 U	16 U	16 U
Kepon		17 U	17 U	16 U	16 U	16 U
alpha-Chlordane		84 U	86 U	81 U	80 U	80 U
gamma-Chlordane		84 U	86 U	81 U	80 U	80 U
Toxaphene		170 U	170 U	160 U	160 U	160 U
Aroclor-1016		84 U	86 U	81 U	80 U	80 U
Aroclor-1221		84 U	86 U	81 U	80 U	80 U
Aroclor-1232		84 U	86 U	81 U	80 U	80 U
Aroclor-1242		84 U	86 U	81 U	80 U	80 U
Aroclor-1248		84 U	86 U	81 U	80 U	80 U
Aroclor-1254		170 U	170 U	160 U	160 U	160 U
Aroclor-1260		170 U	170 U	160 U	160 U	160 U
Isodrin		17 U	17 U	16 U	16 U	16 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
*- Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. * = Outside of EPA CLP GC

9062L 6004

Custody Transfer Record/Lab Work Request

WESTON

Client Contact/Phone

Refrigerator#									
#Type Container	1/c	1/c	—	—	—	—	1/c	—	—
Volume	40ml	good	—	—	—	—	good	—	—
Preservative	—	—	—	—	—	—	—	—	—
ANALYSES REQUESTED	Volt	OHV	Trough						

NOTES:

0

$$\frac{1}{2} \sqrt{2}$$

Properly Preserved

1

Abstract

1 Present on Outlet

2 Unbroken on July
Backbone "Y."

Y

1. Present Open-Receipt
of Samples Y N

Best

Roy F. Weston, Inc. - Lionville Laboratory
 PEST/PCB ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0272	02/13/90	02/26/90	04/08/90
GS720 01 02	001 REP	S	90LE0272	02/13/90	02/26/90	04/08/90
GS720 01 02	001 MS	S	90LE0272	02/13/90	02/26/90	04/08/90

LAB QC:

PBLK	MB2	S	90LE0272	N/A	02/26/90	04/08/90
PBLK	MB2 BS	S	90LE0272	N/A	02/26/90	04/08/90

WESTON

**ROY F. WESTON, INC.
Lionville Laboratory**

CLIENT: WSRC GUNSITE
RFW #: 9002L604, PESTICIDE/PCB
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of one soil sample collected on 02-13-90.

The sample was extracted on 02-26-90 and analyzed according to criteria set forth in the Contract Lab Program for Pesticide and PCB target compounds on 04-08-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. The following DBC surrogate recoveries are outside EPA QC limits:

<u>SAMPLE ID</u>	<u>%RECOVERY</u>	<u>UPPER LIMIT</u>
GS720-01-02	175	150
GS720-01-02 MS	162	150
PBLKLE0272-MB2	158	150
PBLKLE0272-MB2 BS	184	150

The presence of bis(2-Ethylhexyl) phthalate interferes with the quantitation of DBC recovery.

2. The blank spike recoveries for the following compounds are outside the EPA QC limits:

<u>COMPOUND</u>	<u>%RECOVERY</u>	<u>UPPER/LOWER LIMIT</u>
lindane	140	127
4,4'-DDT	143	134

3. The matrix spike recoveries are within EPA QC limits.

Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

5-2-90
Date

Roy F. Weston, Inc. - Lionville Laboratory
 HB ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0282	02/13/90	02/27/90	03/14/90
LAB QC:						
PBLK	MB1	S	90LE0282	N/A	02/27/90	03/14/90
PBLK	MB1 BS	S	90LE0282	N/A	02/27/90	03/14/90



Roy F. Weston, Inc.
Lionville Laboratory

Client: WSRC Gunsite 720
RFW#: 9002L604, Herbicides
W.O.#: 0630-28-13

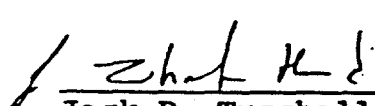
Date Received: 02/16/90

The set of samples consisted of 1 soil sample collected on 02/13/90.

The sample was extracted on 02/27/90 and analyzed according to criteria set forth in Method 8150 for Chlorinated Phenoxy Acid Herbicide target compounds on 03/14/90.

The following is a summary of the QC results accompanying these sample results and a description of any problem encountered during their analysis.

1. The blank spike recoveries are within laboratory control chart warning limits.
2. No problems were encountered during these analyses.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-13-90
Date

RW Number: 9002L604

Roy F. Weston, Inc. Lionville Laboratory
Herbi as by GC

Client: MSRC GUNSITE 720
Work Order: 0630-28-13-0000
Report Date: 04/06/90 07:53
Page: 1

Cust ID: GS720 01 02 PHLK PHLK BS

Sample Information

RW#:	001	90LE0282-MB1	90LE0282-MB1
Matrix:	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00
Units:	ug/Kg	ug/Kg	ug/Kg

Sample	2,4-D	2,4,5-TP (Silver)	2,4,5-T
	22 U	20 U	63 *
	11 U	10 U	111 *
	11 U	10 U	96 *

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
* = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. * = Outside of EPA CLP GC



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC
RFW #: 9002L604, PCDD/PCDF
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02/16/90

NARRATIVE

The set of samples consisted of 1 soil sample collected on 02/13/90.

The samples were extracted on 03/01/90 and analyzed according to criteria set forth in Method 8280 for Tetra through Hexa PCDD/PCDF target compound on 03/12/90.

All surrogate and blank spike recoveries are within EPA QC limits.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-28-90
Date

WESTON ANALYTICS
BLANK SPIKE/BLANK SPIKE DUPLICATE RECOVERY

CLIENT: WSRC

BS GC/MS FILE NAME: 20312008

BSD GC/MS FILE NAME: NA

EXTRACTION BATCH NO: 90SP249

SAMPLE ID : BS

CONTRACTOR: WESTON

DATE EXTRACTED: 03/01/90

DATE ANALYZED: 03/12/90

CLIENT ID:

BS

COMPOUND	AMOUNT SPIKED	SAMPLE WT./VOL.	SPIKE CONC. Ng/g	CONC. FOUND Ng/g	BLANK CONC.	% REC
2,3,7,8-TCDD	50	5.0	10	10.0	ND	100
1,2,3,6,7,8-HXCDD	50	5.0	10	9.2	ND	92
OCDD	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	50	5.0	10	5.0	ND	50
1,2,3,6,7,8-HXCDF	50	5.0	10	9.6	ND	96
OCDF	NA	NA	NA	NA	NA	NA

WESTON ANALYTICS
DIOXINS/FURANS DATA SUMMARY

RFW Batch Number: 9002L604

Client: WSRC

Page:

Sample Information

Client ID: GS720--01 BLANK BLK SPIKE
 RFW#: 001 MB1
 D.F.: 1 MB1 S
 Matrix: 1 Soil
 Units: Ng Ng

C-13 TCDD RECOVERY:
C-13 HxCDD RECOVERY:

56 % 52 % 63 %
76 % 12 % 20 %

	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD
2,3,7,8-TCDD.....	ND	0.10	ND	0.10	10	NA				
TOTAL TCDD.....	ND	0.10	ND	0.10	10	NA				
TOTAL PeCDD.....	ND	0.10	ND	0.10	10	NA				
TOTAL HxCDD.....	ND	0.10	ND	0.10	ND	0.10				
TOTAL TCDF.....	ND	0.10	ND	0.10	5.0	NA				
TOTAL PeCDF.....	ND	0.10	ND	0.10	ND	0.10				
TOTAL HxCDF.....	ND	0.10	ND	0.10	9.6	NA				

CONC CONCENTRATION
 ND NONE DETECTED
 NA NOT APPLICABLE
 LOD LIMIT OF DETECTION

Roy F. Weston, Inc. - Lionville Laboratory
 OPP ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0283	02/13/90	02/27/90	03/23/90
LAB QC:						
PBLK	MB1	S	90LE0283	N/A	02/27/90	03/23/90
PBLK	MB1 BS	S	90LE0283	N/A	02/27/90	03/23/90

WESTON SM

ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02/16/90

NARRATIVE

The set of samples consisted of one soil sample collected on 02/13/90.

The samples were extracted on 02/27/90 and analyzed according to criteria set forth in Method 8140 for Appendix IX Organophosphorus Pesticide target compounds on 03/23/90.

All surrogate and blank spike recoveries are within QC limits.

No problems were encountered during sample analysis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-29-90
Date

GLOSSARY OF PEST/PCB DATA**DATA QUALIFIERS**

- U - Indicates that the compounds was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J - Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

RTM Batch Number: 90021604

Client: MSRG GUNSITE 720

Work Order: 0630-28-13-0000

Page: 1

ORTHOPOSPHATE PESTICIDES

Report Date: 03/26/90 10:24

Cust ID: GS720 01 02

PBLK

PBLK BS

Sample Information

RTM#: 001 90LE0283-MB1 90LE0283-MB1
Matrix: SOIL SOIL SOIL
D.F.: 0.500 0.500 0.500
Units: ug/Kg ug/Kg ug/Kg

Surrogate:	Ethion	69	%	62	%	64	%
Diazinon		7.3	U	6.7	U	6.9	%
Methyl Parathion		7.3	U	6.7	U	6.0	%
O,O,O-Triethyl Phosphorothioate		36	U	33	U	33	U
Thionazin (zinophos)		36	U	33	U	33	U
Phorate		7.3	U	6.7	U	6.7	U
Sulfotep		36	U	33	U	33	U
Disulfoton		7.3	U	6.7	U	6.7	U
Dimethoate		36	U	33	U	33	U
Ethyl Parathion		7.3	U	6.7	U	6.7	U
Famphur (Famophos)		73	U	67	U	67	U

U- Analyzed, not detected. J- Present below detection limit. B- Present in blank. NR- Not requested. NS- Not spiked.
% - Percent recovery. D- Diluted out. I- Interference. NA- Not Applicable. *- Outside of EPA CLP GC



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

INORGANIC NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All preparation blanks were analyzed below the required detection limit.
2. All calibration verification checks were within the required control limits of 90-100%. Calibration verification is performed using independent standards.
3. All laboratory control standards (blank spikes) were within the control limits of 80-120%.
4. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).
5. USEPA-CLP SOW 787 was followed for the analysis of cyanide.

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-21-90
Date

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis. (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	GS720 01 02	% SOLIDS	92.1	%	0.10
		CYANIDE, TOTAL	1.1 u	MG/KG	1.1
		SULFIDE	0.27 u	MG/KG	0.27

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-----	-----	-----	-----	-----	-----
BLANK2	90LC082-MB2	CYANIDE, TOTAL	1.0 u	MG/KG	1.0
BLANK10	90LSD019-MB1	SULFIDE	0.25 u	MG/KG	0.25
BLANK20	90LSD019-MB2	SULFIDE	0.25 u	MG/KG	0.25
BLANK30	90LSD019-MB3	SULFIDE	0.25 u	MG/KG	0.25
BLANK40	90LSD019-MB4	SULFIDE	0.25 u	MG/KG	0.25

ROY F. WESTON INC.

INORGANICS ACCURACY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
BLANK10	90LSD019-MB1	SULFIDE	1.0	0.25u	1.0	102
BLANK20	90LSD019-MB2	SULFIDE	0.96	0.25u	1.0	95.9
BLANK30	90LSD019-MB3	SULFIDE	1.0	0.25u	1.0	101
BLANK40	90LSD019-MB4	SULFIDE	1.0	0.25u	1.0	102

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 03/14/90

SAMPLE -----	SITE ID -----	ANALYTE -----	SPIKED SAMPLE -----	SPIKED AMOUNT -----	UNITS -----	%RECOV -----
LCSS3	90LC082-LCS3	CYANIDE, TOTAL LCS	8.9	10.0	MG/KG	89.3
LCSS4	90LC082-LCS4	CYANIDE, TOTAL LCS	9.1	10.0	MG/KG	91.4

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
---------------------	-------	-----	--------	------------	-----------	----------

GS720 01 02

% SOLIDS	001	S	90LS039	02/13/90	03/07/90	03/08/90
TOTAL CYANIDE	001	S	90LC082	02/13/90	02/25/90	02/26/90
SULFIDE	001	S	90LSD019	02/13/90	03/12/90	03/12/90

LAB QC:

TOTAL CYANIDE	CCB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	ICB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	ICV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	LCS L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	LCS L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	MB2	W	90LC082	N/A	02/25/90	02/26/90
SULFIDE	MB1	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB1 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB2	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB2 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB3	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB3 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB4	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB4 BS	W	90LSD019	N/A	03/12/90	03/12/90

CUSTOMER
ATTENTION
ADDRESS
CITY
W.O. NO.

Weston - SRP
Mark T. Carkhuff
208 Welsh Pool Rd.
Lionville, Pa 19353
E-1588
Lab Code : BE

ALBUQUERQUE LABORATORY



15-101

03/09/90

TYPE OF ANALYSIS

CUSTOMER ORDER NUMBER

SAMPLES RECEIVED

Customer Identification	DATE TIME ANALY.	Date Collected	Type of Analysis	ACTIVITY/ERROR		UNTS	ACCRCY	INST/INT
L603002 E1738	021490 1245	02/13-21	ALPHA	23.00	7.00	pCi/g	1.22	39 C A
L603002 E1738	021490 1245	02/13-21	BETA	4.00	4.00	pCi/g	1.13	39 C A
L603005 E1739	021490 1130	02/13-21	ALPHA	20.00	8.00	pCi/g	1.22	40 C A
L603005 E1739	021490 1130	02/13-21	BETA	4.00	4.00	pCi/g	1.13	40 C A
L603014 E1740	021390 1400	02/13-21	ALPHA	18.00	7.00	pCi/g	1.22	41 C A
L603014 E1740	021390 1400	02/13-21	BETA	4.00	3.00	pCi/g	1.13	41 C A
L606001 E1741	022090 1120	02/13-21	ALPHA	14.00	7.00	pCi/g	1.22	42 C A
L606001 E1741	022090 1120	02/13-21	BETA	0.00	3.00	pCi/g	1.13	42 C A
L606002 E1742	022090 1230	02/13-21	ALPHA	21.00	7.00	pCi/g	1.22	43 C A
L606002 E1742	022090 1230	02/13-21	BETA	8.00	3.00	pCi/g	1.13	43 C A
L606003 E1743	022090 1430	02/13-21	ALPHA	30.00	8.00	pCi/g	1.22	44 C A
L606003 E1743	022090 1430	02/13-21	BETA	9.00	4.00	pCi/g	1.13	44 C A
L606011 E1744	041690 1510	02/13-21	ALPHA	22.00	8.00	pCi/g	1.22	45 C A
L606011 E1744	041690 1510	02/13-21	BETA	10.00	4.00	pCi/g	1.13	45 C A

REPORTED VIA TELEPHONE

☐ FAX

PAGE 1 OF 1

MA Eberline
Thermo Analytical Inc.

7021 PAN AMERICAN FREEWAY, N.E.
ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 345-3461
FAX (505) 761-5416

APPROVED BY

B-41

Rod Melgard, Mgr.

04-20-1990

DATE

CUSTOMER
ATTENTION
ADDRESS
CITY
W.O. NO.

Weston - SRP
Mark T. Carkhuff
208 Welsh Pool Rd.
Lionville, Pa 19353
E-1589
Lab Code : BE

ALBUQUERQUE LABORATORY



15-101

03/09/90

TYPE OF ANALYSIS

CUSTOMER ORDER NUMBER

SAMPLES RECEIVED

DATE
TIME
ANALY.

Date
Collected

Type of
Analysis

ACTIVITY/ERROR

UNTS

ACCRCY

INST/INIT

Customer
Identification

L606014	032790	02/21/90	ALPHA	0.00	2.00	pC1/1	1.22	46 DDP
E1745	1045							
L606014	032790	02/21/90	BETA	0.00	3.00	pC1/1	1.13	46 DDP
E1745	1045							

REPORTED VIA TELEPHONE

☐ FAX

PAGE 1 OF 1

TMA Eberline
Thermo Analytical Inc.

7021 PAN AMERICAN FREEWAY, N.E.
ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 345-3461
FAX (505) 761-5416

APPROVED BY

B-42

R. Melgard
Rod Melgard, Mgr.

04-20-1990

DATE



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-10

SAMPLES RECEIVED: 02-16-90

METALS NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met for water samples. Note: Holding times for soil samples have not been promulgated by the USEPA.
2. All calibration verification checks were within the required control limits of 90-100% (85-115% for -Hg). Calibration verification is performed using independent standards from Inorganic Ventures, Inc.
3. All preparation blanks were analyzed below the required detection limit.
4. Laboratory control standards were within the control limits of 80-120% with the exception of silver (59%) for site ID# 90L0226-LC1. The blank spike reproducibility was outside the 20% window for silver at 58%.

Note: The USEPA-CLP has dropped control limits for silver and antimony due to documented difficulties in obtaining reliable results. WESTON Analytics has adopted the same policy.

5. The analytical methods applied by the laboratory for the determination of metals are:

As: EPA 206.2	Hg: EPA 245.1
Se: EPA 270.2	ICP Scan: EPA 200.7
Pb: EPA 239.2	All Others: EPA 200.7
Tl: EPA 279.2	EP Leachates (except Hg): 200.7

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-9-90
Date

ROY F. WESTON, INC.

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	GS720 01 02	SILVER, TOTAL	1.7 u	MG/KG	1.7
		ARSENIC, TOTAL	1.7 u	MG/KG	1.7
		BARIUM, TOTAL	34.8 u	MG/KG	34.8
		BERYLLIUM, TOTAL	0.87 u	MG/KG	0.87
		CADMIUM, TOTAL	0.87 u	MG/KG	0.87
		COBALT, TOTAL	8.7 u	MG/KG	8.7
		CHROMIUM, TOTAL	3.2	MG/KG	1.7
		COPPER, TOTAL	4.4 u	MG/KG	4.4
		MERCURY, TOTAL	0.12	MG/KG	0.11
		NICKEL, TOTAL	7.0 u	MG/KG	7.0
		LEAD, TOTAL	5.6	MG/KG	0.52
		ANTIMONY, TOTAL	10.4 u	MG/KG	10.4
		SELENIUM, TOTAL	0.87 u	MG/KG	0.87
		TIN, TOTAL	25.7	MG/KG	17.4
		THALLIUM, TOTAL	1.7 u	MG/KG	1.7
		VANADIUM, TOTAL	8.7 u	MG/KG	8.7
		ZINC, TOTAL	88.7	MG/KG	3.5

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK1	90L0226-MB1	SILVER, TOTAL	2.0 u	MG/KG	2.0
		BARIUM, TOTAL	40.0 u	MG/KG	40.0
		BERYLLIUM, TOTAL	1.0 u	MG/KG	1.0
		CADMIUM, TOTAL	1.0 u	MG/KG	1.0
		COBALT, TOTAL	10.0 u	MG/KG	10.0
		CHROMIUM, TOTAL	2.0 u	MG/KG	2.0
		COPPER, TOTAL	5.0 u	MG/KG	5.0
		NICKEL, TOTAL	8.0 u	MG/KG	8.0
		ANTIMONY, TOTAL	12.0 u	MG/KG	12.0
		TIN, TOTAL	20.0 u	MG/KG	20.0
		VANADIUM, TOTAL	10.0 u	MG/KG	10.0
		ZINC, TOTAL	4.0 u	MG/KG	4.0
BLANK1	90L0225-MB1	ARSENIC, TOTAL	2.0 u	MG/KG	2.0
		LEAD, TOTAL	0.60 u	MG/KG	0.60
		SELENIUM, TOTAL	1.0 u	MG/KG	1.0
		THALLIUM, TOTAL	2.0 u	MG/KG	2.0
BLANK1	90C040B-MB1	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK2	90C040B-MB2	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK3	90C040B-MB3	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK4	90C040B-MB4	MERCURY, TOTAL	0.10 u	MG/KG	0.10

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ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LCS2	90L0226-LC2	SILVER, LCS	59.0	107	57.6
		BARIUM, LCS	102	101	0.74
		BERYLLIUM, LCS	107	108	1.3
		CADMIUM, LCS	106	106	0.30
		COBALT, LCS	104	104	0.029
		CHROMIUM, LCS	112	111	0.50
		COPPER, LCS	109	110	0.95
		NICKEL, LCS	104	105	0.48
		ANTIMONY, LCS	93.1	93.7	0.64
		TIN, LCS	92.6	93.0	0.41
		VANADIUM, LCS	116	118	1.7
		ZINC, LCS	103	103	0.058
LCS2	90L0225-LC2	ARSENIC, LCS	94.0	97.7	3.8
		LEAD, LCS	113	112	0.89
		SELENIUM, LCS	111	113	1.5
		THALLIUM, LCS	107	109	1.2
LCS2	90C040B-LC2	MERCURY, LCS	106	103	3.4

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
-----	-----	-----	-----	-----	-----	-----
LCS1	90L0226-LC1	SILVER, LCS	59.0	100	MG/KG	59.0
		BARIUM, LCS	1020	1000	MG/KG	102
		BERYLLIUM, LCS	53.3	50.0	MG/KG	107
		CADMIUM, LCS	53.1	50.0	MG/KG	106
		COBALT, LCS	520	500	MG/KG	104
		CHROMIUM, LCS	112	100	MG/KG	112
		COPPER, LCS	271	250	MG/KG	109
		NICKEL, LCS	417	400	MG/KG	104
		ANTIMONY, LCS	559	600	MG/KG	93.1
		TIN, LCS	926	1000	MG/KG	92.6
		VANADIUM, LCS	580	500	MG/KG	116
		ZINC, LCS	205	200	MG/KG	103
LCS2	90L0226-LC2	SILVER, LCS	107	100	MG/KG	107
		BARIUM, LCS	1010	1000	MG/KG	101
		BERYLLIUM, LCS	54.1	50.0	MG/KG	108
		CADMIUM, LCS	53.0	50.0	MG/KG	106
		COBALT, LCS	520	500	MG/KG	104
		CHROMIUM, LCS	111	100	MG/KG	111
		COPPER, LCS	274	250	MG/KG	110
		NICKEL, LCS	419	400	MG/KG	105
		ANTIMONY, LCS	562	600	MG/KG	93.7
		TIN, LCS	930	1000	MG/KG	93.0
		VANADIUM, LCS	590	500	MG/KG	118
		ZINC, LCS	206	200	MG/KG	103
LCS1	90L0225-LC1	ARSENIC, LCS	5.6	6.0	MG/KG	94.0
		LEAD, LCS	6.8	6.0	MG/KG	113
		SELENIUM, LCS	6.7	6.0	MG/KG	111
		THALLIUM, LCS	6.4	6.0	MG/KG	107
LCS2	90L0225-LC2	ARSENIC, LCS	5.9	6.0	MG/KG	97.7
		LEAD, LCS	6.7	6.0	MG/KG	112
		SELENIUM, LCS	6.8	6.0	MG/KG	113
		THALLIUM, LCS	6.5	6.0	MG/KG	109
LCS1	90C040B-LC1	MERCURY, LCS	1.1	1.0	MG/KG	106
LCS2	90C040B-LC2	MERCURY, LCS	1.0	1.0	MG/KG	103
LCS3	90C040B-LC3	MERCURY, LCS	1.1	1.0	MG/KG	110

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE -----	SITE ID -----	ANALYTE -----	SPIKED SAMPLE -----	SPIKED AMOUNT -----	UNITS -----	%RECOV -----
LCS4	90C040B-LC4	MERCURY, LCS	1.1	1.0	MG/KG	114

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT #: 9002L604

CLIENT ID / ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02						
SILVER, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	001	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
BERYLLIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
COBALT, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
COPPER, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	001	S	90C040B	02/13/90	03/12/90	03/13/90
NICKEL, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
LEAD, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/05/90
ANTIMONY, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
SELENIUM, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/01/90
TIN, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
THALLIUM, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/04/90
VANADIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
ZINC, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90

LAB QC:

SILVER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BARIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COBALT, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COPPER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
NICKEL, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
TIN, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ZINC, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ARSENIC LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC, TOTAL	MB1	S	90L0225	N/A	03/09/90	03/30/90
LEAD, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/04/90
MERCURY LABORATORY	LC1 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB1	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040B	N/A	03/12/90	03/13/90

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 10-01E	001	W	90LVK031	02/14/90	N/A	02/26/90
GS720 14-01	002	S	90LVW029	02/14/90	N/A	02/26/90
GS720 04-01	003	S	90LVW027	02/14/90	N/A	02/23/90
GS720 02-01	004	S	90LVW027	02/14/90	N/A	02/23/90
GS720 03-01	005	S	90LVW027	02/14/90	N/A	02/23/90
GS720 02-01A	006	S	90LVW027	02/14/90	N/A	02/23/90
GS720 11-01E	007	W	90LVK031	02/14/90	N/A	02/26/90
GS720 06-01	008	S	90LVW027	02/14/90	N/A	02/23/90
GS720 05-01	009	S	90LVW027	02/14/90	N/A	02/23/90
GS720 12-01B	010	W	90LVK031	02/14/90	N/A	02/26/90
GS720 01-02	011	S	90LVW028	02/13/90	N/A	02/24/90
GS720 08-01	012	S	90LVW028	02/13/90	N/A	02/24/90
GS720 07-01	013	S	90LVW030	02/13/90	N/A	02/27/90
GS720 01-01	014	S	90LVW028	02/13/90	N/A	02/24/90

LAB QC:

VBLK	MB1	W	90LVK031	N/A	N/A	02/26/90
VBLK	MB1	S	90LVW029	N/A	N/A	02/26/90
VBLK	MB1	S	90LVW027	N/A	N/A	02/23/90
VBLK	MB1	S	90LVW028	N/A	N/A	02/24/90
VBLK	MB1	S	90LVW030	N/A	N/A	02/27/90



002872

ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC-GUNSITE 720
RFW #: 9002L603, GC/MS VOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of three water samples and eleven soil samples collected on 02-13,14-90.

The samples were analyzed according to criteria set forth in SW 846 Method 8240 for TCL Volatile target compounds on 02-23,24,26,27-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were not detected in these samples.
2. All surrogate recoveries are within EPA QC limits.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-3-90
Date

DATA QUALIFIERS

- U - Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.
- X - Additional qualifiers used as required are explained in the case narrative.
- NQ - Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CIP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

Cust ID: GS720 10-01E GS720 14-01 GS720 04-01 GS720 02-01 GS720 03-01 GS720 02-01A

Sample Information	RPM#	Matrix	D.F.:	Units	001	002	003	004	005	006
		WATER	1.00	ug/L		SOIL	SOIL	SOIL	SOIL	SOIL
						1.00	1.00	1.00	1.00	1.00
						ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

Surrogate	Bromofluorobenzene	110	%	99	%	97	%	101	%	104	%	104	%	105	%
Recovery	1,2-Dichloroethane-d4	99	%	91	%	94	%	93	%	96	%	100	%		
Chloromethane		10	U	11	U	10	U	11	U	11	U	10	U		
Bromomethane		10	U	11	U	10	U	11	U	11	U	10	U		
Vinyl Chloride		5	J	11	U	10	U	11	U	11	U	10	U		
Chloroethane		10	U	11	U	10	U	11	U	11	U	10	U		
Methylene Chloride		3	JB	11	B	9	B	11	B	8	B	8	B		
Acetone		10	U	17	B	12	B	13	B	13	B	14	B		
Carbon Disulfide		5	U	5	U	5	U	5	U	5	U	5	U		
1,1-Dichloroethane		5	U	5	U	5	U	5	U	5	U	5	U		
1,1-Dichloroethane		5	U	5	U	5	U	5	U	5	U	5	U		
1,2-Dichloroethane (total)		20		5	U	5	U	5	U	5	U	5	U		
Chloroform		5	U	5	U	1	JB	5	U	5	U	5	U		
1,2-Dichloroethane		5	U	5	U	5	U	5	U	5	U	5	U		
2-Butanone		10	U	11	U	10	U	11	U	11	U	10	U		
1,1,1-Trichloroethane		5	U	5	U	5	U	5	U	5	U	5	U		
Carbon Tetrachloride		5	U	5	U	5	U	5	U	5	U	5	U		
Vinyl Acetate		10	U	11	U	10	U	11	U	11	U	10	U		
Bromodichloromethane		5	U	5	U	5	U	5	U	5	U	5	U		
1,2-Dichloropropane		5	U	5	U	5	U	5	U	5	U	5	U		
cis-1,3-Dichloropropene		5	U	5	U	5	U	5	U	5	U	5	U		
Trichloroethene		6		5	U	5	U	5	U	5	U	5	U		
Dibromochloromethane		5	U	5	U	5	U	5	U	5	U	5	U		
1,1,2-Trichloroethane		5	U	5	U	5	U	5	U	5	U	5	U		
Benzene		5	U	5	U	5	U	5	U	5	U	5	U		
Trans-1,3-Dichloropropene		5	U	5	U	5	U	5	U	5	U	5	U		
Bromoform		5	U	5	U	5	U	5	U	5	U	5	U		
4-Methyl-2-pentanone		10	U	11	U	10	U	11	U	11	U	10	U		
2-Hexanone		10	U	11	U	10	U	11	U	11	U	10	U		
Tetrachloroethene		5	U	5	U	5	U	5	U	5	U	5	U		
1,1,2,2-Tetrachloroethane		5	U	5	U	5	U	5	U	5	U	5	U		

* Outside of EPA CLP GC limits.

Cust ID: GS720 10-01E GS720 14-

GS720 04-01

GS720 02-01

GS720 03-01

GS720 02-01A

RFM#:

001

002

003

004

005

006

	001	002	003	004	005	006
Toluene	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U	5 U	5 U

* = Outside of EPA CLP GC limits.

Roy F. Weston, Inc. - Lionville Laboratory

Report Date: 03/26/90 15:49

Volatiles by GC/MS, HSL List

Page: 2a

RFW Batch Number: 9002L603

Client: WSRC GUNSITE 720

Work Order: 0630-28-13-0000

Cust ID: GS720 11-01E GS720 06-01 GS720 05-01 GS720 12-01B GS720 01-02 GS720 08-01

Sample Information	RFW#:	007	008	009	010	011	012
	Matrix:	WATER	SOIL	SOIL	WATER	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	0.986
	Units:	ug/L	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg
Surrogate	Toluene-d8	113 *	104	101	114 *	106	100
Recovery	Bromofluorobenzene	101	107	104	101	100	99
	1,2-Dichloroethane-d4	105	96	95	101	108	97
Chloromethane		10 U	12 U	11 U	10 U	11 U	12 U
Bromomethane		10 U	12 U	11 U	10 U	11 U	12 U
Vinyl Chloride		2 J	12 U	11 U	10 U	11 U	12 U
Chloroethane		10 U	12 U	11 U	10 U	11 U	12 U
Methylene Chloride		4 JB	8 B	8 B	6 B	9 B	10 B
Acetone		4 J	17 B	12 B	10 U	24 B	16 B
Carbon Disulfide		2 JB	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethene		5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethene (total)		8	6 U	5 U	1 J	5 U	6 U
Chloroform		5 U	2 JB	1 JB	5 U	5 U	6 U
1,2-Dichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
2-Butanone		10 U	12 U	11 U	10 U	11 U	12 U
1,1,1-Trichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
Carbon Tetrachloride		5 U	6 U	5 U	5 U	5 U	6 U
Vinyl Acetate		10 U	12 U	11 U	10 U	11 U	12 U
Bromodichloromethane		5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloropropane		5 U	6 U	5 U	5 U	5 U	6 U
cis-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U	6 U
Trichloroethene		2 J	6 U	5 U	5 U	5 U	6 U
Dibromochloromethane		5 U	6 U	5 U	5 U	5 U	6 U
1,1,2-Trichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
Benzene		5 U	6 U	5 U	5 U	5 U	6 U
Trans-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U	6 U
Bromoform		5 U	6 U	5 U	5 U	5 U	6 U
4-Methyl-2-pentanone		10 U	12 U	11 U	10 U	11 U	12 U
2-Hexanone		10 U	12 U	11 U	10 U	11 U	12 U
Tetrachloroethene		2 J	6 U	5 U	5 U	5 U	6 U
1,1,2,2-Tetrachloroethane		5 U	6 U	5 U	5 U	5 U	6 U

** Outside of EPA CLP QC limits.

RFW Batch Number: 9002L603 Client: WSRC GUNSITE 720 Work Order: 0630-28-13-0000 Page: 2b
 Cust ID: GS720 11-01E GS720 06-01 GS720 05-01 GS720 12-01B GS720 01-02 GS720 08-01

RFW#:	007	008	009	010	011	012
Toluene	5 U	6 U	5 U	5 U	5 U	6 U
Chlorobenzene	5 U	6 U	5 U	5 U	5 U	6 U
Ethylbenzene	5 U	6 U	5 U	5 U	5 U	6 U
Styrene	5 U	6 U	5 U	5 U	5 U	6 U
Xylene (total)	5 U	6 U	5 U	5 U	5 U	6 U

*= Outside of EPA CLP QC limits.

RFW Batch Number: 90021603

Client: WSRC GUNSITE 720

Work Order: 0630-28-13-0000

Cust ID: GS720 07-01 GS720 01-01

VBLK

VBLK

VBLK

VBLK

Sample

RFW#:

Information

Matrix:

D.F.:

Units:

013

SOIL

0.988

ug/Kg

90LVK031-MB1

WATER

1.00

ug/L

90LVW029-MB1

SOIL

1.00

ug/Kg

90LVW027-MB1

SOIL

1.00

ug/Kg

90LVW028-MB1

SOIL

1.00

ug/Kg

Toluene-d8

104

108

110

101

102

99

Surrogate Bromofluorobenzene

107

88

102

102

103

101

Recovery 1,2-Dichloroethane-d4

105

102

105

96

112

96

Chloromethane

13

11

10

10

10

10

Bromomethane

13

11

10

10

10

10

Vinyl Chloride

13

11

10

10

10

10

Chloroethane

13

11

10

10

10

10

Methylene Chloride

14

10

4

11

11

8

Acetone

12

24

10

13

13

13

Carbon Disulfide

6

6

1

5

5

5

1,1-Dichloroethene

6

6

5

5

5

5

1,1-Dichloroethane

6

6

5

5

5

5

1,2-Dichloroethene (total)

6

6

5

5

5

5

Chloroform

1

6

5

5

1

5

1,2-Dichloroethane

6

6

5

5

5

5

2-Butanone

13

11

10

10

10

10

1,1,1-Trichloroethane

6

6

5

5

5

5

Carbon Tetrachloride

6

6

5

5

5

5

Vinyl Acetate

13

11

10

10

10

10

Bromodichloromethane

6

6

5

5

5

5

1,2-Dichloropropane

6

6

5

5

5

5

cis-1,3-Dichloropropene

6

6

5

5

5

5

Trichloroethene

6

6

5

5

5

5

Dibromochloromethane

6

6

5

5

5

5

1,1,2-Trichloroethane

6

6

5

5

5

5

Benzene

6

6

5

5

5

5

Trans-1,3-Dichloropropene

6

6

5

5

5

5

Bromoform

6

6

5

5

5

5

4-Methyl-2-pentanone

13

11

10

10

5

5

2-Hexanone

13

11

10

10

6

6

Tetrachloroethene

6

6

5

5

5

5

1,1,2,2-Tetrachloroethane

6

6

5

5

1

1

* = Outside of EPA CLP QC limits.

RFW#:	013	014	90LVK031-MB1	90LVW029-MB1	90LVW027-MB1	90LVW028-MB1
Toluene	6 U	6 U	5 U	5 U	5 U	5 U
Chlorobenzene	6 U	6 U	5 U	5 U	5 U	5 U
Ethylbenzene	6 U	6 U	5 U	5 U	5 U	5 U
Styrene	6 U	6 U	5 U	5 U	5 U	5 U
Xylene (total)	6 U	6 U	5 U	5 U	5 U	5 U

** Outside of EPA CLP QC limits.

RFW Batch Number: 90Q2L603

Client: WSRC GUNSITE 720

Work Order: 0630-28-13-0000

Page: 4a

Cust ID: VBLK

Sample Information

RFW#:	90LVW030-NB1
Matrix:	SOIL
D.F.:	1.00
Units:	ug/Kg

Surrogate	Toluene-d8	105
Bromofluorobenzene		105
Recovery 1,2-Dichloroethane-d4		107
Chloromethane		10 U
Bromomethane		10 U
Vinyl Chloride		10 U
Chloroethane		10 U
Methylene Chloride		9
Acetone		16
Carbon Disulfide		5 U
1,1-Dichloroethene		5 U
1,1-Dichloroethane		5 U
1,2-Dichloroethene (total)		5 U
Chloroform		1 J
1,2-Dichloroethane		5 U
2-Butanone		10 U
1,1,1-Trichloroethane		5 U
Carbon Tetrachloride		5 U
Vinyl Acetate		10 U
Bromodichloromethane		5 U
1,2-Dichloropropane		5 U
cis-1,3-Dichloropropene		5 U
Trichloroethene		5 U
Dibromochloromethane		5 U
1,1,2-Trichloroethane		5 U
Benzene		5 U
Trans-1,3-Dichloropropene		5 U
Bromoform		5 U
4-Methyl-2-pentanone		4 J
2-Hexanone		10 U
Tetrachloroethene		5 U
1,1,2,2-Tetrachloroethane		5 U

* = Outside of EPA CLP QC limits.

*= Outside of EPA CLP OC limits.

Cust ID: VBLK

RFW#: 90LVW030-MB1

Toluene	5 U
Chlorobenzene	5 U
Ethylbenzene	5 U
Styrene	5 U
Xylene (total)	5 U

*= Outside of EPA CLP QC limits.



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L603
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

METALS NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met for water samples. Note: Holding times for soil samples have not been promulgated by the USEPA.
2. All calibration verification checks were within the required control limits of 90-100% (85-115% for Hg). Calibration verification is performed using independent standards from Inorganic Ventures, Inc.
3. All preparation blanks were analyzed below the required detection limit.
4. Laboratory control standards were within the control limits of 80-120% with the exception of silver (59%) for site ID# 90L0226-LC1 and (127%) for site ID# 90L0219-LC1. The blank spike reproducibility was outside the 20% window for silver at 58%.

Note: The USEPA-CLP has dropped control limits for silver and antimony due to documented difficulties in obtaining reliable results. WESTON Analytics has adopted the same policy.

5. The analytical methods applied by the laboratory for the determination of metals are:

As: EPA 206.2	Hg: EPA 245.1
Se: EPA 270.2	ICP Scan: EPA 200.7
Pb: EPA 239.2	All Others: EPA 200.7
Tl: EPA 279.2	EP Leachates (except Hg): 200.7

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-9-90
Date

ROY F. WESTON, INC.

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	GS720 10-01E	SILVER, TOTAL	10.0	u UG/L	10.0
		ARSENIC, TOTAL	10.0	u UG/L	10.0
		BARIUM, TOTAL	200	u UG/L	200
		CADMIUM, TOTAL	5.0	u UG/L	5.0
		CHROMIUM, TOTAL	10.0	u UG/L	10.0
		MERCURY, TOTAL	0.20	u UG/L	0.20
		LEAD, TOTAL	3.0	u UG/L	3.0
		SELENIUM, TOTAL	5.0	u UG/L	5.0
-002	GS720 14-01	SILVER, TOTAL	1.6	u MG/KG	1.6
		ARSENIC, TOTAL	1.9	u MG/KG	1.9
		BARIUM, TOTAL	32.1	u MG/KG	32.1
		CADMIUM, TOTAL	0.80	u MG/KG	0.80
		CHROMIUM, TOTAL	3.0	u MG/KG	1.6
		MERCURY, TOTAL	0.11	u MG/KG	0.11
		LEAD, TOTAL	2.6	u MG/KG	0.58
		SELENIUM, TOTAL	0.97	u MG/KG	0.97
-003	GS720 04-01	SILVER, TOTAL	1.8	u MG/KG	1.8
		ARSENIC, TOTAL	1.7	u MG/KG	1.7
		BARIUM, TOTAL	37.0	u MG/KG	37.0
		CADMIUM, TOTAL	0.92	u MG/KG	0.92
		CHROMIUM, TOTAL	3.0	u MG/KG	1.8
		MERCURY, TOTAL	0.11	u MG/KG	0.11
		LEAD, TOTAL	6.8	u MG/KG	0.50
		SELENIUM, TOTAL	0.83	u MG/KG	0.83
-004	GS720 02-01	SILVER, TOTAL	1.9	u MG/KG	1.9
		ARSENIC, TOTAL	1.8	u MG/KG	1.8
		BARIUM, TOTAL	38.3	u MG/KG	38.3
		CADMIUM, TOTAL	0.96	u MG/KG	0.96
		CHROMIUM, TOTAL	2.7	u MG/KG	1.9
		MERCURY, TOTAL	0.10	u MG/KG	0.10
		LEAD, TOTAL	2.8	u MG/KG	0.55
		SELENIUM, TOTAL	0.92	u MG/KG	0.92

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	GS720 03-01	SILVER, TOTAL	2.1 u	MG/KG	2.1
		ARSENIC, TOTAL	2.0 u	MG/KG	2.0
		BARIUM, TOTAL	41.8 u	MG/KG	41.8
		CADMIUM, TOTAL	1.0 u	MG/KG	1.0
		CHROMIUM, TOTAL	2.9	MG/KG	2.1
		MERCURY, TOTAL	0.11 u	MG/KG	0.11
		LEAD, TOTAL	2.2	MG/KG	0.60
		SELENIUM, TOTAL	1.0 u	MG/KG	1.0
-011	GS720 01-02	SILVER, TOTAL	1.6 u	MG/KG	1.6
		ARSENIC, TOTAL	1.7 u	MG/KG	1.7
		BARIUM, TOTAL	31.8 u	MG/KG	31.8
		CADMIUM, TOTAL	0.80 u	MG/KG	0.80
		CHROMIUM, TOTAL	6.1	MG/KG	1.6
		MERCURY, TOTAL	0.12	MG/KG	0.11
		LEAD, TOTAL	3.9	MG/KG	0.52
		SELENIUM, TOTAL	0.87 u	MG/KG	0
-014	GS720 01-01	SILVER, TOTAL	2.0 u	MG/KG	2.0
		ARSENIC, TOTAL	2.2 u	MG/KG	2.2
		BARIUM, TOTAL	53.9	MG/KG	39.6
		CADMIUM, TOTAL	0.99 u	MG/KG	0.99
		CHROMIUM, TOTAL	4.0	MG/KG	2.0
		MERCURY, TOTAL	0.11 u	MG/KG	0.11
		LEAD, TOTAL	4.4	MG/KG	0.65
		SELENIUM, TOTAL	1.1 u	MG/KG	1.1

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK1	90L0219-MB1	SILVER, TOTAL	10.0 u	UG/L	10.0
		BARIUM, TOTAL	200 u	UG/L	200
		CADMIUM, TOTAL	5.0 u	UG/L	5.0
		CHROMIUM, TOTAL	10.0 u	UG/L	10.0
BLANK1	90L0218-MB1	ARSENIC, TOTAL	10.0 u	UG/L	10.0
		LEAD, TOTAL	3.0 u	UG/L	3.0
		SELENIUM, TOTAL	5.0 u	UG/L	5.0
BLANK1	90C040A-MB1	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK2	90C040A-MB2	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK3	90C040A-MB3	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK4	90C040A-MB4	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK1	90L0226-MB1	SILVER, TOTAL	2.0 u	MG/KG	2.0
		BARIUM, TOTAL	40.0 u	MG/KG	40.0
		CADMIUM, TOTAL	1.0 u	MG/KG	1.0
		CHROMIUM, TOTAL	2.0 u	MG/KG	2.0
BLANK1	90L0225-MB1	ARSENIC, TOTAL	2.0 u	MG/KG	2.0
		LEAD, TOTAL	0.60 u	MG/KG	0.60
		SELENIUM, TOTAL	1.0 u	MG/KG	1.0
BLANK1	90C040B-MB1	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK2	90C040B-MB2	MERCURY, TOTAL	0.10 u	MG/KG	0.10

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK3	90C040B-MB3	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK4	90C040B-MB4	MERCURY, TOTAL	0.10 u	MG/KG	0.10

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ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LCS2	90L0219-LC2	SILVER, LCS	127	119	6.0
		BARIUM, LCS	102	101	1.2
		CADMIUM, LCS	115	111	3.4
		CHROMIUM, LCS	120	116	3.3
LCS2	90L0218-LC2	ARSENIC, LCS	87.0	90.7	4.1
		LEAD, LCS	105	104	0.95
		SELENIUM, LCS	110	113	2.7
LCS2	90C040A-LC2	MERCURY, LCS	106	103	3.4
LCS2	90L0226-LC2	SILVER, LCS	59.0	107	57.6
		BARIUM, LCS	102	101	0.74
		CADMIUM, LCS	106	106	0.30
		CHROMIUM, LCS	112	111	0.50
LCS2	90L0225-LC2	ARSENIC, LCS	94.0	97.7	3.8
		LEAD, LCS	113	112	0.89
		SELENIUM, LCS	111	113	1.5
LCS2	90C040B-LC2	MERCURY, LCS	106	103	3.4

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	90L0219-LC1	SILVER, LCS	633	500	UG/L	127
		BARIUM, LCS	5100	5000	UG/L	102
		CADMIUM, LCS	287	250	UG/L	115
		CHROMIUM, LCS	599	500	UG/L	120
LCS2	90L0219-LC2	SILVER, LCS	596	500	UG/L	119
		BARIUM, LCS	5040	5000	UG/L	101
		CADMIUM, LCS	278	250	UG/L	111
		CHROMIUM, LCS	580	500	UG/L	116
LCS1	90L0218-LC1	ARSENIC, LCS	26.1	30.0	UG/L	87.0
		LEAD, LCS	31.6	30.0	UG/L	105
		SELENIUM, LCS	33.1	30.0	UG/L	110
LCS2	90L0218-LC2	ARSENIC, LCS	27.2	30.0	UG/L	90.7
		LEAD, LCS	31.3	30.0	UG/L	104
		SELENIUM, LCS	34.0	30.0	UG/L	113
LCS1	90C040A-LC1	MERCURY, LCS	2.1	2.0	UG/L	106
LCS2	90C040A-LC2	MERCURY, LCS	2.1	2.0	UG/L	103
LCS3	90C040A-LC3	MERCURY, LCS	2.2	2.0	UG/L	110
LCS4	90C040A-LC4	MERCURY, LCS	2.3	2.0	UG/L	114
LCS1	90L0226-LC1	SILVER, LCS	59.0	100	MG/KG	59.0
		BARIUM, LCS	1020	1000	MG/KG	102
		CADMIUM, LCS	53.1	50.0	MG/KG	106
		CHROMIUM, LCS	112	100	MG/KG	112
LCS2	90L0226-LC2	SILVER, LCS	107	100	MG/KG	107
		BARIUM, LCS	1010	1000	MG/KG	101
		CADMIUM, LCS	53.0	50.0	MG/KG	106
		CHROMIUM, LCS	111	100	MG/KG	111

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE -----	SITE ID -----	ANALYTE -----	SPIKED SAMPLE -----	SPIKED AMOUNT -----	UNITS -----	%RECOV -----
LCS1	90L0225-LC1	ARSENIC, LCS	5.6	6.0	MG/KG	94.0
		LEAD, LCS	6.8	6.0	MG/KG	113
		SELENIUM, LCS	6.7	6.0	MG/KG	111
LCS2	90L0225-LC2	ARSENIC, LCS	5.9	6.0	MG/KG	97.7
		LEAD, LCS	6.7	6.0	MG/KG	112
		SELENIUM, LCS	6.8	6.0	MG/KG	113
LCS1	90C040B-LC1	MERCURY, LCS	1.1	1.0	MG/KG	106
LCS2	90C040B-LC2	MERCURY, LCS	1.0	1.0	MG/KG	103
LCS3	90C040B-LC3	MERCURY, LCS	1.1	1.0	MG/KG	110
LCS4	90C040B-LC4	MERCURY, LCS	1.1	1.0	MG/KG	114

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 10-01E						
SILVER, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
ARSENIC, TOTAL	001	W	90L0218	02/14/90	03/08/90	03/30/90
BARIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
CADMIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
CHROMIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
MERCURY, TOTAL	001	W	90C040A	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	001	W	90L0218	02/14/90	03/08/90	04/05/90
SELENIUM, TOTAL	001	W	90L0218	02/14/90	03/08/90	04/02/90
GS720 14-01						
SILVER, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	002	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	002	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	002	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	002	S	90L0225	02/14/90	03/09/90	04/01/90
GS720 04-01						
SILVER, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	003	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	003	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	003	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	003	S	90L0225	02/14/90	03/09/90	04/01/90
GS720 02-01						
SILVER, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	004	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	004	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	004	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	004	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 03-01

SILVER, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	005	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	005	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	005	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	005	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 01-02

SILVER, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	011	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	011	S	90C040B	02/13/90	03/12/90	03/13/90
LEAD, TOTAL	011	S	90L0225	02/13/90	03/09/90	04/05/90
SELENIUM, TOTAL	011	S	90L0225	02/13/90	03/09/90	04/01/90

GS720 01-01

SILVER, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	014	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	014	S	90C040B	02/13/90	03/12/90	03/13/90
LEAD, TOTAL	014	S	90L0225	02/13/90	03/09/90	04/05/90
SELENIUM, TOTAL	014	S	90L0225	02/13/90	03/09/90	04/01/90

LAB QC:

SILVER LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
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Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BARIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
SILVER LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
BARIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
SILVER, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
BARIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
ARSENIC LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	03/30/90
LEAD LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	04/02/90
ARSENIC LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	03/30/90
LEAD LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	04/02/90
ARSENIC, TOTAL	MB1	W	90L0218	N/A	03/08/90	03/30/90
LEAD, TOTAL	MB1	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM, TOTAL	MB1	W	90L0218	N/A	03/08/90	04/02/90
MERCURY LABORATORY	LC1 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB1	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040A	N/A	03/12/90	03/13/90
SILVER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILVER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BARIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COBALT, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COPPER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
NICKEL, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
TIN, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ZINC, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ARSENIC LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC, TOTAL	MB1	S	90L0225	N/A	03/09/90	03/30/90
LEAD, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/04/90
MERCURY LABORATORY	LC1 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040B	N/A	03/12/90	03/13/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY, TOTAL	MB1	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040B	N/A	03/12/90	03/13/90

Roy F. Weston, Inc. - Lionville Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 14-01	002	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 02-01	004	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 02-01A	006	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 06-01	008	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 05-01	009	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 01-02	011	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 08-01	012	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 07-01	013	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 01-01	014	S	90LE0272	02/13/90	02/26/90	03/09/90

LAB QC:

SBLK	MB1	S	90LE0272	N/A	02/26/90	03/07/90
SBLK	MB1 BS	S	90LE0272	N/A	02/26/90	03/07/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC-GUNSITE 720
RFW #: 9002L603, SEMIVOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of nine soil samples collected on 02-13,14-90.

The samples were extracted on 02-26-90 and analyzed according to criteria set forth in SW 846 Method 8270 for TCL Semivolatile target compounds on 03-07,08,09-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were detected in these samples.
2. One of sixty-six surrogate recoveries is outside the EPA QC limits. However, EPA QC surrogate recovery criteria are met [i.e., no more than one outlier per fraction (acid and base neutral) and no recoveries less than 10%].
3. The matrix spike and replicate requirement are fulfilled by sample GS720-01-02 (9002L604-001) also extracted in batch 90LE0272.

Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-16-90
Date

maj/wpmemo/02-603s.cn

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- A = Aldol Condensation Product.
- X = Additional qualifiers used as required are explained in the case narrative.
- NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not applicable.
- DF = Dilution factor.
- NR = Not required.

RPM BL Number: 90021603

roy r. weston, Inc. - Lionville Laboratory
Semi-volatile GC/MS, HSL List
Client: NSRC GUNSITE 720

Work Order: 0630-28-13-0000
Report Date: 04/04/17:31
Page: 18

Quest ID: GS720 14-01 GS720 02-01 GS720 02-01A GS720 06-01 GS720 05-01 GS720 01-02

Sample Information

RFM#:	002	004	006	008	009	011
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

Surrogate Recovery	Nitrobenzene-d5	56	59	46	60	65	83
	2-Fluorobiphenyl	68	68	53	72	79	77
	p-Terphenyl-d14	80	79	63	91	94	116
	Phenol-d5	69	71	52	79	79	114 *
	2-Fluorophenol	62	65	45	72	64	91
	2,4,6-Tribromophenol	64	59	39	81	54	57

Phenol	350	350	340	370	350	350
bis(2-Chloroethyl)ether	350	350	340	370	350	350
2-Chlorophenol	350	350	340	370	350	350
1,3-Dichlorobenzene	350	350	340	370	350	350
1,4-Dichlorobenzene	350	350	340	370	350	350
Benzyl alcohol	350	350	340	370	350	350
1,2-Dichlorobenzene	350	350	340	370	350	350
2-Methylphenol	350	350	340	370	350	350
bis(2-Chloroisopropyl)ether	350	350	340	370	350	350
4-Methylphenol	350	350	340	370	350	350
N-Nitroso-Di-n-propylamine	350	350	340	370	350	350
Hexachloroethane	350	350	340	370	350	350
Nitrobenzene	350	350	340	370	350	350
Isophorone	350	350	340	370	350	350
2-Nitrophenol	350	350	340	370	350	350
2,4-Dimethylphenol	350	350	340	370	350	350
Benzoic acid	1800	1700	1700	1800	1800	1800
bis(2-Chloroethoxy)methane	350	350	340	370	350	350
2,4-Dichlorophenol	350	350	340	370	350	350
1,2,4-Trichlorobenzene	350	350	340	370	350	350
Naphthalene	350	350	340	370	350	350
4-Chloroaniline	350	350	340	370	350	350
Hexachlorobutadiene	350	350	340	370	350	350
4-Chloro-3-methylphenol	350	350	340	370	350	350
2-Methylnaphthalene	350	350	340	370	350	350
Hexachlorocyclopentadiene	350	350	340	370	350	350

* Outside of EPA CLP GC Limits.

Chemical Name	002	004	006	008	009	011
2,4,6-Trichlorophenol	350 U	350 U	340 U	370 U	350 U	350 U
2,4,5-Trichlorophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
2-Chloronaphthalene	350 U	350 U	340 U	370 U	350 U	350 U
2-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Dimethylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
Acenaphthylene	350 U	350 U	340 U	370 U	350 U	350 U
2,6-Dinitrotoluene	350 U	350 U	340 U	370 U	350 U	350 U
3-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Acenaphthene	350 U	350 U	340 U	370 U	350 U	350 U
2,4-Dinitrophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
4-Nitrophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Dibenzofuran	350 U	350 U	340 U	370 U	350 U	350 U
2,4-Dinitrotoluene	350 U	350 U	340 U	370 U	350 U	350 U
Diethylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
4-Chlorophenyl-phenylether	350 U	350 U	340 U	370 U	350 U	350 U
Fluorene	350 U	350 U	340 U	370 U	350 U	350 U
4-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
4,6-Dinitro-2-methylphenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	350 U	350 U	340 U	370 U	350 U	350 U
4-Bromophenyl-phenylether	350 U	350 U	340 U	370 U	350 U	350 U
Hexachlorobenzene	350 U	350 U	340 U	370 U	350 U	350 U
Pentachlorophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Phenanthrene	350 U	350 U	340 U	370 U	350 U	350 U
Anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Di-n-Butylphthalate	350 U	41 J	340 U	370 U	350 U	40 J
Fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Butylbenzylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
3,3'-Dichlorobenzidine	700 U	690 U	680 U	740 U	710 U	700 U
Benzo(a)anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Chrysene	350 U	350 U	340 U	370 U	350 U	350 U
bis(2-Ethylhexyl)phthalate	410	300 J	660	190 J	330 J	39 J
Di-n-Octyl phthalate	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(b)fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(k)fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(a)pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Indeno(1,2,3-cd)pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Dibenzo(a,h)anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(g,h,i)perylene	350 U	350 U	340 U	370 U	350 U	350 U

(1) - Cannot be separated from Diphenylamine. * - Outside of EPA CLP QC limits.

Cust ID: GS720 08-01 GS720 07-01 GS720 01-01
 SBLK SBLK BS

Sample Information
 RFW#: 012 013 014 90LE0272-MB1 90LE0272-MB1
 Matrix: SOIL SOIL SOIL SOIL SOIL
 D.F.: 1.00 1.00 1.00 1.11 1.11
 Units: ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg

Surrogate Recovery	Nitrobenzene-d5 2-Fluorobiphenyl p-Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	70 % 66 % 99 % 93 % 66 % 44 %	48 % 47 % 86 % 64 % 48 % 43 %	75 % 69 % 93 % 99 % 71 % 43 %	68 % 76 % 91 % 71 % 55 % 42 %	68 % 75 % 87 % 78 % 64 % 59 %
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Phenol	380 U	370 U	360 U	370 U	81 %
bis(2-Chloroethyl)ether	380 U	370 U	360 U	370 U	370 U
2-Chlorophenol	380 U	370 U	360 U	370 U	74 %
1,3-Dichlorobenzene	380 U	370 U	360 U	370 U	370 U
1,4-Dichlorobenzene	380 U	370 U	360 U	370 U	74 %
Benzyl alcohol	380 U	370 U	360 U	370 U	370 U
1,2-Dichlorobenzene	380 U	370 U	360 U	370 U	370 U
2-Methylphenol	380 U	370 U	360 U	370 U	370 U
bis(2-Chloroisopropyl)ether	380 U	370 U	360 U	370 U	370 U
4-Methylphenol	380 U	370 U	360 U	370 U	370 U
N-Nitroso-Di-n-propylamine	380 U	370 U	360 U	370 U	63 %
Hexachloroethane	380 U	370 U	360 U	370 U	370 U
Nitrobenzene	380 U	370 U	360 U	370 U	370 U
Isophorone	380 U	370 U	360 U	370 U	370 U
2-Nitrophenol	380 U	370 U	360 U	370 U	370 U
2,4-Dimethylphenol	380 U	370 U	360 U	370 U	370 U
Benzolic acid	1900 U	1800 U	1800 U	1800 U	1800 U
bis(2-Chloroethoxy)methane	380 U	370 U	360 U	370 U	370 U
2,4-Dichlorophenol	380 U	370 U	360 U	370 U	370 U
1,2,4-Trichlorobenzene	380 U	370 U	360 U	370 U	88 %
Naphthalene	380 U	370 U	360 U	370 U	370 U
4-Chloroaniline	380 U	370 U	360 U	370 U	370 U
Hexachlorobutadiene	380 U	370 U	360 U	370 U	370 U
4-Chloro-3-methylphenol	380 U	370 U	360 U	370 U	76 %
2-Methylnaphthalene	380 U	370 U	360 U	370 U	370 U
Hexachlorocyclopentadiene	380 U	370 U	360 U	370 U	370 U

* Outside of EPA CLP GC limits.

Cust ID: GS720 08-01 GS720 07-01 GS720 01-01

SBLK

SBLK BS

RM#:

012

013

014

90LE0272-MB1

90LE0272-MB1

2,4,6-Trichlorophenol	380	U	370	U	360	U	370	U	370	U
2,4,5-Trichlorophenol	1900	U	1800	U	1800	U	1800	U	1800	U
2-Chloronaphthalene	380	U	370	U	360	U	370	U	370	U
2-Nitroaniline	1900	U	1800	U	1800	U	1800	U	1800	U
Dimethylphthalate	380	U	370	U	360	U	370	U	370	U
Acenaphthylene	380	U	370	U	360	U	370	U	370	U
2,6-Dinitrotoluene	380	U	370	U	360	U	370	U	370	U
3-Nitroaniline	1900	U	1800	U	1800	U	1800	U	1800	U
Acenaphthene	380	U	370	U	360	U	370	U	94	%
2,4-Dinitrophenol	1900	U	1800	U	1800	U	1800	U	1800	U
4-Nitrophenol	1900	U	1800	U	1800	U	1800	U	106	%
Dibenzofuran	380	U	370	U	360	U	370	U	370	U
2,4-Dinitrotoluene	380	U	370	U	360	U	370	U	78	%
Diethylphthalate	380	U	370	U	360	U	370	U	370	U
4-Chlorophenyl-phenylether	380	U	370	U	360	U	370	U	370	U
Fluorene	380	U	370	U	360	U	370	U	370	U
4-Nitroaniline	1900	U	1800	U	1800	U	1800	U	1800	U
4,6-Dinitro-2-methylphenol	1900	U	1800	U	1800	U	1800	U	1800	U
N-Nitrosodiphenylamine (1)	380	U	370	U	360	U	370	U	370	U
4-Bromophenyl-phenylether	380	U	370	U	360	U	370	U	370	U
Hexachlorobenzene	380	U	370	U	360	U	370	U	370	U
Pentachlorophenol	1900	U	1800	U	1800	U	1800	U	95	%
Phenanthrene	380	U	370	U	360	U	370	U	370	U
Anthracene	380	U	370	U	360	U	370	U	370	U
Di-n-Butylphthalate	380	U	370	U	360	U	370	U	370	U
Fluoranthene	380	U	370	U	360	U	370	U	370	U
Pyrene	380	U	370	U	360	U	370	U	113	%
Butylbenzylphthalate	380	U	370	U	360	U	370	U	370	U
3,3'-Dichlorobenzidine	750	U	730	U	720	U	740	U	740	U
Benzo(a)anthracene	380	U	370	U	360	U	370	U	370	U
Chrysene	380	U	370	U	360	U	370	U	370	U
bis(2-Ethylhexyl)phthalate	55	J	67	J	360	U	370	U	370	U
Di-n-Octyl phthalate	380	U	370	U	360	U	370	U	370	U
Benzo(b)fluoranthene	380	U	370	U	360	U	370	U	370	U
Benzo(k)fluoranthene	380	U	370	U	360	U	370	U	370	U
Benzo(a)pyrene	380	U	370	U	360	U	370	U	370	U
Indeno(1,2,3-cd)pyrene	380	U	370	U	360	U	370	U	370	U
Dibenzo(a,h)anthracene	380	U	370	U	360	U	370	U	370	U
Benzo(g,h,i)perylene	380	U	370	U	360	U	370	U	370	U
(1) - Cannot be separated from Diphenylamine.	380	U	370	U	360	U	370	U	370	U

* = Outside of EPA CLP QC limits.

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 14-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-002

Sample wt/vol: 30.9 (g/mL) G

Lab File ID: M030806

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.77	900	JAB
2.	ALDOL CONDENSATE	6.48	300	JAB
3.	UNKNOWN	19.18	300	J
4.	ADIPATE	22.25	100	JB
5.	HYDROCARBON	22.87	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 02-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-004

Sample wt/vol: 30.9 (g/mL) G

Lab File ID: M030807

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	300	JAB
3.	UNKNOWN	19.17	400	J
4.	ADIPATE	22.23	100	JB
5.	UNKNOWN	22.83	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 02-01A

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-006

Sample wt/vol: 31.0 (g/mL) G

Lab File ID: M030808

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 5 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	1000	JAB
2.	ALDOL CONDENSATE	6.52	500	JAB
3.	ALDOL CONDENSATE	7.55	400	JA
4.	UNKNOWN	19.17	300	J
5.	HYDROCARBON	22.85	100	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: ROY F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 06-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-008

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030809

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 11 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	500	JAB
3.	ALDOL CONDENSATE	7.55	500	JA
4.	UNKNOWN	19.18	600	J
5.	HYDROCARBON	22.87	300	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

GS720 05-01

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-009

Sample wt/vol: 30.6 (g/mL) G

Lab File ID: M030810

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	400	JAB
3.	UNKNOWN	19.18	500	J
4.	ADIPATE	22.25	200	JB
5.	HYDROCARBON	22.87	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01-02

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-011

Sample wt/vol: 30.8 (g/mL) G

Lab File ID: M030903

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y

pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.85	3000	JAB
2.	ALDOL CONDENSATE	6.55	600	JAB
3.	ALDOL CONDENSATE	7.57	400	JA
4.	UNKNOWN	19.18	500	J
5.	HYDROCARBON	22.85	500	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 08-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-012

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030904

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 13 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.30	300	JA
2.	ALDOL CONDENSATE	5.80	3000	JAB
3.	ALDOL CONDENSATE	6.52	800	JAB
4.	ALDOL CONDENSATE	7.55	500	JA
5.	UNKNOWN	19.20	400	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

GS720 07-01

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-013

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030905

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 11 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	600	JAB
3.	ALDOL CONDENSATE	7.55	600	JA
4.	UNKNOWN	19.17	300	J
5.	HYDROCARBON	22.83	300	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

GS720 01-01

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-014

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: M030906

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	3000	JAB
2.	ALDOL CONDENSATE	6.53	1000	JAB
3.	ALDOL CONDENSATE	7.57	100	JA
4.	UNKNOWN	19.18	1000	J
5.	HYDROCARBON	22.82	1000	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

SBLK

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 90LE0272-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: M030713

Level: (low/med) LOW

Date Received: 02/26/90

% Moisture: not dec. 0 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y

pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.78	1000	JA
2.	ALDOL CONDENSATE	6.52	1000	JA
3.	UNKNOWN	7.30	200	J
4.	UNKNOWN	9.02	200	J
5.	ADIPATE	22.22	200	J



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L603
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

INORGANIC NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All preparation blanks were analyzed below the required detection limit.
2. All calibration verification checks were within the required control limits of 90-100%. Calibration verification is performed using independent standards.
3. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-21-90
Date

ROY F. WESTON, INC.

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-002	GS720 14-01	% SOLIDS	92.2	%	0.10
		TOTAL ORGANIC CARBON	274	MG/KG	28.0
		PH	4.9	PH UNITS	0.10
-003	GS720 04-01	% SOLIDS	93.4	%	0.10
		TOTAL ORGANIC CARBON	2700	MG/KG	50.0
		PH	5.2	PH UNITS	0.10
-004	GS720 02-01	% SOLIDS	94.8	%	0.10
-005	GS720 03-01	% SOLIDS	94.7	%	0.10
-011	GS720 01-02	% SOLIDS	93.0	%	0.10
-014	GS720 01-01	% SOLIDS	89.9	%	0.10
		TOTAL ORGANIC CARBON	5180	MG/KG	104
		PH	5.0	PH UNITS	0.10

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L503

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	20.0	u MG/KG	20.0
BLANK20	90LTZ001-MB2	TOTAL ORGANIC CARBON	20.0	u MG/KG	20.0

002872.

ROY F. WESTON INC.

INORGANICS ACCURACY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	410	20.0 u	400	102
		TOTAL ORGANIC CARBON	412	20.0 u	400	103
BLANK20	90LTZ001-MB2	TOTAL ORGANIC CARBON	395	20.0 u	400	98.8

ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	SPIKE#1	SPIKE#2	%DIFF
			%RECOV	%RECOV	
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	102	103	0.50

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 14-01						
% SOLIDS	002	S	90L&S040	02/14/90	03/03/90	03/04/90
GROSS ALPHA	002	S		02/14/90		
GROSS BETA	002	S		02/14/90		
TOTAL ORGANIC CARBON	002	S	90LTZ001	02/14/90	03/01/90	03/01/90
PH	002	S	90LPH042	02/14/90	03/08/90	03/08/90
GS720 04-01						
% SOLIDS	003	S	90L&S040	02/14/90	03/03/90	03/04/90
TOTAL ORGANIC CARBON	003	S	90LTZ001	02/14/90	03/01/90	03/01/90
PH	003	S	90LPH042	02/14/90	03/08/90	03/08/90
GS720 02-01						
% SOLIDS	004	S	90L&S040	02/14/90	03/03/90	03/04/90
GS720 03-01						
% SOLIDS	005	S	90L&S040	02/14/90	03/03/90	03/04/90
GROSS ALPHA	005	S		02/14/90		
GROSS BETA	005	S		02/14/90		
GS720 01-02						
% SOLIDS	011	S	90L&S040	02/13/90	03/03/90	03/04/90
GS720 01-01						
% SOLIDS	014	S	90L&S040	02/13/90	03/03/90	03/04/90
GROSS ALPHA	014	S		02/13/90		
GROSS BETA	014	S		02/13/90		
TOTAL ORGANIC CARBON	014	S	90LTZ001	02/13/90	03/01/90	03/01/90
PH	014	S	90LPH042	02/13/90	03/08/90	03/08/90

LAB QC:

TOTAL ORGANIC CARBON	MB1	S	90LTZ001	N/A	03/01/90	03/01/90
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002872.

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	MB1 BS	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB1 BSD	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB2	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB2 BS	S	90LTZ001	N/A	03/01/90	03/01/90

ROY F. WESTON, INC.
Lionville Laboratory

Client: WSRC GUNSITE 720
RFW # : 9002L603
W.O. #: 0630-28-13-0000

U = Indicates that the compound was analyzed for but not detected. The detection limit for the sample (not the method detection limit) is reported with U (e.g., 10u).

J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10mg/L and a concentration of 3mg/L is calculated, it is reported as 3J.

NA = Not Applicable. NR = Not Required.

NC = Not calculable, results below detection limit.

The method used for the analysis of petroleum hydrocarbons is EPA Method 418.1 (USEPA 600/4-79-020). Solid samples are extracted using Method 9071 (USEPA SW846) then analyzed by EPA Method 418.1.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

- . Blank spike recoveries were acceptable.
- . Blanks were free of contamination.

Samples Received : 02/16/90
Date of Extraction: 02/28/90
Date Of Analysis : 03/02/90

cc Steph D. Neff
1 J. Michael Taylor
Project Director
Lionville Analytical Laboratory

3-13-90
DATE

RFW Batch Number: 9002L603

Petroleum Hydrocarbons by IR
Client: MSRC GUNSITE 720
Work Order: 0630-28-13-0000Report Date: 03/13/90 10:12
Page: 1

Sample Information

RFW#:	008	012	013	013 REP	013 MS	013 MSD
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg

Petroleum Hydrocarbon

	4.4 U	4.6 U	12	11	71 %	72 %

Cust ID: PBLK PBLK BS

Sample Information

RFW#:	90DHC055-MB1	90DHC055-MB1
Matrix:	SOIL	SOIL
D.F.:	1.00	1.00
Units:	mg/Kg	mg/Kg

Petroleum Hydrocarbon

	4.0 U	90 %

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

ROY F. WESTON, INC.
Lionville Laboratory

Client: WSRC GUNSITE 720
RFW # : 9002L603
W.O. #: 0630-28-13-0000

- U = Indicates that the compound was analyzed for but not detected. The detection limit for the sample (not the method detection limit) is reported with U (e.g., 10u).
- J = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10mg/L and a concentration of 3mg/L is calculated, it is reported as 3J.

NA = Not Applicable. NR = Not Required.

NC = Not calculable, results below detection limit.

The method used for the analysis of petroleum hydrocarbons is EPA Method 418.1 (USEPA 600/4-79-020). Solid samples are extracted using Method 9071 (USEPA SW846) then analyzed by EPA Method 418.1.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

- . Blank spike recoveries were acceptable.
- . Blanks were free of contamination.

Samples Received : 02/16/90
Date of Extraction: 02/28/90
Date Of Analysis : 03/02/90

for Steph D. Weston
J. Michael Taylor
Project Director
Lionville Analytical Laboratory

3-13-90
DATE

RFW Batch Number: 9002L603

Client: MSRC GUNSITE 720

Report Date: 03/13/90 10:12
Page: 1

Petroleum Hydrocarbons by IR

Sample Information	Cust ID: 6S720 06-01		6S720 08-01		6S720 07-01		6S720 07-01		6S720 07-01	
	RFW#:	008	012	013	013 REP	013 MS	013 MSD			
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00			
	Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg			
Petroleum Hydrocarbon		4.4 U	4.6 U	12	11	71 %	72 %			

Cust ID: PBLK PBLK BS

Sample Information
RFW#: 90DHC055-MB1 90DHC055-MB1
Matrix: SOIL SOIL
D.F.: 1.00 1.00
Units: mg/Kg mg/Kg

Petroleum Hydrocarbon 4.0 U 90 %

U- Analyzed, not detected. J- Present below detection limit. B- Present in blank. NR- Not requested. NS- Not spiked.
%- Percent recovery. D- Diluted out. I- Interference. NA- Not Applicable. *- Outside of EPA CLP QC



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC
RFW #: 9002L604, PCDD/PCDF
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02/16/90

NARRATIVE

The set of samples consisted of 1 soil sample collected on 02/13/90.

The samples were extracted on 03/01/90 and analyzed according to criteria set forth in Method 8280 for Tetra through Hexa PCDD/PCDF target compound on 03/12/90.

All surrogate and blank spike recoveries are within EPA QC limits.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-28-90
Date

WESTON ANALYTICS
BLANK SPIKE/BLANK SPIKE DUPLICATE RECOVERY

CLIENT: WSRC
BS GC/MS FILE NAME: Z0312008
BSD GC/MS FILE NAME: NA
EXTRACTION BATCH NO: 90SP249
SAMPLE ID : BS

CONTRACTOR: WESTON
DATE EXTRACTED: 03/01/90
DATE ANALYZED: 03/12/90
CLIENT ID: BS

COMPOUND	AMOUNT SPIKED ng	SAMPLE WT./VOL.	SPIKE CONC. Ng/g	CONC. FOUND Ng/g	BLANK CONC.	% REC
2,3,7,8-TCDD	50	5.0	10	10.0	ND	100
1,2,3,6,7,8-HXCDD	50	5.0	10	9.2	ND	92
OCDD	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	50	5.0	10	5.0	ND	50
1,2,3,6,7,8-HXCDF	50	5.0	10	9.6	ND	96
OCDF	NA	NA	NA	NA	NA	NA

WESTON ANALYTICAL
DIOXINS/FURANS DATA SUMMARY

RFW Batch Number: 9002L604

Client: WSRC

Page:

Sample Information

Client ID: GS720--01 BLANK BLK SPIKE
 RFW#: -02 MB1
 D.F.: 001 MB1 S
 Matrix: 1 Soil 1 Soil
 Units: Ng Ng Ng

C-13 TCDD RECOVERY:
 C-13 HxCDD RECOVERY:

56 % 52 % 63 %
 76 % 12 % 20 %

	CONC	LOD	CONC	LOD	CONC	LOD	CONC	LOD
2,3,7,8-TCDD.....	ND	0.10	ND	0.10	10	NA		
TOTAL TCDD.....	ND	0.10	ND	0.10	10	NA		
TOTAL PeCDD.....	ND	0.10	ND	0.10	ND	0.10		
TOTAL HxCDD.....	ND	0.10	ND	0.10	9.2	NA		
TOTAL TCDF.....	ND	0.10	ND	0.10	5.0	NA		
TOTAL PeCDF.....	ND	0.10	ND	0.10	ND	0.10		
TOTAL HxCDF.....	ND	0.10	ND	0.10	9.6	NA		

CONC CONCENTRATION
 ND NONE DETECTED
 NA NOT APPLICABLE
 LOD LIMIT OF DETECTION

Roy F. Weston, Inc. - Lionville Laboratory
 HB ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0282	02/13/90	02/27/90	03/14/90

LAB QC:

PBLK	MB1	S	90LE0282	N/A	02/27/90	03/14/90
PBLK	MB1 BS	S	90LE0282	N/A	02/27/90	03/14/90



Roy F. Weston, Inc.
Lionville Laboratory

Client: WSRC Gunsite 720
RFW#: 9002L604, Herbicides
W.O.#: 0630-28-13

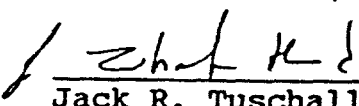
Date Received: 02/16/90

The set of samples consisted of 1 soil sample collected on 02/13/90.

The sample was extracted on 02/27/90 and analyzed according to criteria set forth in Method 8150 for Chlorinated Phenoxy Acid Herbicide target compounds on 03/14/90.

The following is a summary of the QC results accompanying these sample results and a description of any problem encountered during their analysis.

1. The blank spike recoveries are within laboratory control chart warning limits.
2. No problems were encountered during these analyses.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-13-90
Date

Client: WSRC GUNSITE 720

Cust ID: G8720 01 02

PBLK

PKLX BS

**Sample
information**

REF# :

100

90LE0282-MB1 90LE0282-MB1

282-MB1

Matix:

BOIL

BOIL

8011

D.F.:

1.00

1.00

1.00

Unit 1

ug/kg**ug/kg**

ug/kg

2,4-D

22

20 C

63

2,4,5-TP (811v0x)

11

100

111

2,4,5-T

11

100

96

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
 * = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. * = Outside of EPA CLP QC

Roy F. Weston, Inc. - Lionville Laboratory
 BNA ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0272	02/13/90	02/26/90	03/07/90
GS720 01 02	001 REP	S	90LE0272	02/13/90	02/26/90	03/07/90
GS720 01 02	001 MS	S	90LE0272	02/13/90	02/26/90	03/07/90

LAB QC:

SBLK	MB1	S	90LE0272	N/A	02/26/90	03/07/90
SBLK	MB1 BS	S	90LE0272	N/A	02/26/90	03/07/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC - GUNSITE 720

SAMPLES RECEIVED: 02-16-90

RFW #: 9002L604, GC/MS SEMIVOLATILE

W.O. #: 0630-28-13

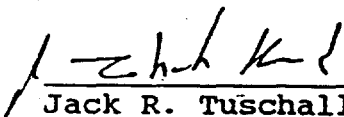
NARRATIVE

The set of samples consisted of one soil sample collected on 02-13-90.

The sample was extracted on 02-26-90 and analyzed according to criteria set forth in Method 8270 for Appendix IX Semivolatile target compounds on 03-07-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were detected in these samples.
2. All surrogate, matrix and blank spike recoveries are within EPA QC limits.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-16-90
Date

sma/cn/02-604b.cn

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- A = Aldol Condensation Product.
- X = Additional qualifiers used as required are explained in the case narrative.
- NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not applicable.
- DF = Dilution factor.
- NR = Not required.

Customer ID: GS720 01 02 GS720 01 02 GS720 01 02

SBLK

SBLK BS

Sample Information

RFW#: 001 001 REP 001 MS 90LE0272-MB1 90LE0272-MB1
Matrix: SOIL SOIL SOIL SOIL SOIL
D.F.: 1.11 1.11 1.11 1.11 1.11
Units: ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg

Nitrobenzene-d5	56	%	47	%	48	%	68	%	68	%
Surrogate	63	%	57	%	57	%	76	%	75	%
Recovery	73	%	71	%	70	%	91	%	87	%
2-Fluorophenyl	68	%	56	%	61	%	71	%	78	%
2,4,6-Tribromophenol	60	%	49	%	51	%	55	%	64	%
Phenol	57	%	50	%	56	%	42	%	59	%
Phenol	390	u	400	u	63	%	370	u	81	%
bis(2-chloroethyl)ether	390	u	400	u	380	u	370	u	370	u
2-chlorophenol	390	u	400	u	57	%	370	u	74	%
1,3-dichlorobenzene	390	u	400	u	380	u	370	u	370	u
1,4-dichlorobenzene	390	u	400	u	50	%	370	u	74	%
Benzyl alcohol	390	u	400	u	380	u	370	u	370	u
1,2-dichlorobenzene	390	u	400	u	380	u	370	u	370	u
2-methylphenol	390	u	400	u	380	u	370	u	370	u
bis(2-chloroisopropyl)ether	390	u	400	u	380	u	370	u	370	u
4-methylphenol	390	u	400	u	380	u	370	u	370	u
N-Nitroso-Di-n-propylamine	390	u	400	u	46	%	370	u	63	%
Hexachloroethane	390	u	400	u	380	u	370	u	370	u
Nitrobenzene	390	u	400	u	380	u	370	u	370	u
Isophorone	390	u	400	u	380	u	370	u	370	u
2-Nitrophenol	390	u	400	u	380	u	370	u	370	u
2,4-Dimethylphenol	390	u	400	u	380	u	370	u	370	u
Benzic acid	2000	u	2000	u	1900	u	1800	u	1800	u
bis(2-chloroethoxy)methane	390	u	400	u	380	u	370	u	370	u
2,4-Dichlorophenol	390	u	400	u	380	u	370	u	370	u
1,2,4-Trichlorobenzene	390	u	400	u	60	%	370	u	88	%
Naphthalene	390	u	400	u	380	u	370	u	370	u
4-Chloroaniline	390	u	400	u	380	u	370	u	370	u
Hexachlorobutadiene	390	u	400	u	380	u	370	u	370	u
4-Chloro-3-methylphenol	390	u	400	u	61	%	370	u	76	%
2-Methylnaphthalene	390	u	400	u	380	u	370	u	370	u
Hexachlorocyclopentadiene	390	u	400	u	380	u	370	u	370	u
* Outside of EPA CLP GC limits.										

RFM#:	001	001 REP	001 MS	90LE0272-HB1	90LE0272-HB1
2,4,6-Trichlorophenol	390 U	400 U	380 U	370 U	370 U
2,4,5-Trichlorophenol	2000 U	2000 U	1900 U	1800 U	1800 U
2-Chloronaphthalene	390 U	400 U	380 U	370 U	370 U
2-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
Dimethylphthalate	390 U	400 U	380 U	370 U	370 U
Acenaphthylene	390 U	400 U	380 U	370 U	370 U
2,6-Dinitrotoluene	390 U	400 U	380 U	370 U	370 U
3-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
Acenaphthene	390 U	400 U	71 U	370 U	94 U
2,4-Dinitrophenol	2000 U	2000 U	1900 U	1800 U	1800 U
4-Nitrophenol	2000 U	2000 U	80 U	1800 U	106 U
Dibenzofuran	390 U	400 U	380 U	370 U	370 U
2,4-Dinitrotoluene	390 U	400 U	60 U	370 U	78 U
Diethylphthalate	390 U	400 U	380 U	370 U	370 U
4-Chlorophenyl-phenylether	390 U	400 U	380 U	370 U	370 U
Fluorene	390 U	400 U	380 U	370 U	370 U
4-Nitroaniline	2000 U	2000 U	1900 U	1800 U	1800 U
4,6-Dinitro-2-methylphenol	2000 U	2000 U	1900 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	390 U	400 U	380 U	370 U	370 U
4-Bromophenyl-phenylether	390 U	400 U	380 U	370 U	370 U
Hexachlorobenzene	390 U	400 U	380 U	370 U	370 U
Pentachlorophenol	2000 U	2000 U	77 U	1800 U	95 U
Phenanthrene	390 U	400 U	380 U	370 U	370 U
Anthracene	390 U	400 U	380 U	370 U	370 U
Di-n-Butylphthalate	390 U	400 U	380 U	370 U	370 U
Fluoranthene	390 U	400 U	380 U	370 U	370 U
Pyrene	390 U	400 U	90 U	370 U	113 U
Butylbenzylphthalate	390 U	400 U	380 U	370 U	370 U
3,3'-Dichlorobenzidine	780 U	790 U	750 U	740 U	740 U
Benzo(a)anthracene	390 U	400 U	380 U	370 U	370 U
Chrysene	390 U	400 U	380 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	39 U	400 U	380 U	370 U	370 U
Di-n-Octyl phthalate	390 U	400 U	380 U	370 U	370 U
Benzo(b)fluoranthene	390 U	400 U	380 U	370 U	370 U
Benzo(k)fluoranthene	390 U	400 U	380 U	370 U	370 U
Benzo(a)pyrene	390 U	400 U	380 U	370 U	370 U
Indeno(1,2,3-cd)pyrene	390 U	400 U	380 U	370 U	370 U
Dibenzo(a,h)anthracene	390 U	400 U	380 U	370 U	370 U
Benzo(g,h,i)perylene	390 U	400 U	380 U	370 U	370 U
1,4-Dioxane	390 U	400 U	380 U	370 U	370 U

* Outside of EPA CLP GC limits.

RFW#:	001	001 REP	001 MS	90LE0272-MB1	90LE0272-MB1
Methyl methacrylate	390 U	400 U	380 U	370 U	370 U
Pyridine	390 U	400 U	380 U	370 U	370 U
N-Nitrosodimethylamine	390 U	400 U	380 U	370 U	370 U
Ethyl methacrylate	390 U	400 U	380 U	370 U	370 U
2-Picoline	390 U	400 U	380 U	370 U	370 U
N-Nitrosomethylethylamine	390 U	400 U	380 U	370 U	370 U
Methyl methanesulfonate	390 U	400 U	380 U	370 U	370 U
N-Nitrosodimethylamine	390 U	400 U	380 U	370 U	370 U
Ethyl methanesulfonate	390 U	400 U	380 U	370 U	370 U
Aniline	390 U	400 U	380 U	370 U	370 U
Pentachloroethane	390 U	400 U	380 U	370 U	370 U
3-Methylphenol	390 U	400 U	380 U	370 U	370 U
N-Nitrosopyrrolidine	390 U	400 U	380 U	370 U	370 U
Acetophenone	390 U	400 U	380 U	370 U	370 U
N-Nitrosomorpholine	390 U	400 U	380 U	370 U	370 U
O-Toluidine	390 U	400 U	380 U	370 U	370 U
N-Nitrosopiperidine	2000 U	2000 U	1900 U	1800 U	1800 U
a,a-Dimethylphenethylamine	390 U	400 U	380 U	370 U	370 U
2,6-Dichlorophenol	390 U	400 U	380 U	370 U	370 U
Hexachloropropene	390 U	400 U	380 U	370 U	370 U
p-Phenylenediamine	390 U	400 U	380 U	370 U	370 U
N-Nitroso-di-n-butylamine	390 U	400 U	380 U	370 U	370 U
Safrole	390 U	400 U	380 U	370 U	370 U
1,2,4,5-Tetrachlorobenzene	390 U	400 U	380 U	370 U	370 U
Isosafrole	390 U	400 U	380 U	370 U	370 U
1,4-Naphthoquinone	390 U	400 U	380 U	370 U	370 U
1,3-Dinitrobenzene	390 U	400 U	380 U	370 U	370 U
Pentachlorobenzene	390 U	400 U	380 U	370 U	370 U
1-Naphthylamine	390 U	400 U	380 U	370 U	370 U
2-Naphthylamine	390 U	400 U	380 U	370 U	370 U
2,3,4,6-Tetrachlorophenol	390 U	400 U	380 U	370 U	370 U
1,3,5-Trinitrobenzene	390 U	400 U	380 U	370 U	370 U
Diallate	390 U	400 U	380 U	370 U	370 U
Phenacetin	390 U	400 U	380 U	370 U	370 U
Diphenylamine	390 U	400 U	380 U	370 U	370 U
5-Nitro-o-toluidine	390 U	400 U	380 U	370 U	370 U
4-Aminobiphenyl	390 U	400 U	380 U	370 U	370 U
Pronamide	390 U	400 U	380 U	370 U	370 U
2-sec-Butyl-4,6-dinitrophenol	2000 U	2000 U	1900 U	1800 U	1800 U
Pentachloronitrobenzene	2000 U	2000 U	1900 U	1800 U	1800 U

* Outside of EPA CLP QC limits.

4-Nitroquinoline-1-oxide	780	U	790	U	750	U	740	U	740	U
Methapyllene	390	U	400	U	380	U	370	U	370	U
Aramite	780	U	790	U	750	U	740	U	740	U
Chlorobenzilate	390	U	400	U	380	U	370	U	370	U
p-Dimethylaminobenzene	390	U	400	U	380	U	370	U	370	U
3,3'-Dimethylbenzidine	390	U	400	U	380	U	370	U	370	U
2-Acetylaminofluorene	390	U	400	U	380	U	370	U	370	U
7,12-Dimethylbenz(a)anthracene	390	U	400	U	380	U	370	U	370	U
Hexachlorophene	3500	U	3600	U	3400	U	3300	U	3300	U
3-Methylcholanthrene	390	U	400	U	380	U	370	U	370	U

(1) - Cannot be separated from Diphenylamine. *- Outside of EPA CLP QC limits.

SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01 02

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L604-001

Sample wt/vol: 30.8 (g/mL) G

Lab File ID: M030707

Level: (low/mad) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y

pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.37	300	JA
2.	ALDOL CONDENSATE	5.85	2000	JAB
3.	ALDOL CONDENSATE	6.55	900	JAB
4.	ALDOL CONDENSATE	7.57	500	JA
5.	UNKNOWN	19.17	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01 02REP

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L604-001 REP

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: M030709

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.32	200	J
2.	ALDOL CONDENSATE	5.82	1000	JAB
3.	ALDOL CONDENSATE	6.52	600	JAB
4.	ALDOL CONDENSATE	7.55	300	JA
5.	UNKNOWN	19.17	200	J

1P
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

SBLK

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 90LE0272-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: M030713

Level: (low/med) LOW

Date Received: 02/26/90

% Moisture: not dec. 0 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.78	1000	JA
2.	ALDOL CONDENSATE	6.52	1000	JA
3.	UNKNOWN	7.30	200	J
4.	UNKNOWN	9.02	200	J
5.	ADIPATE	22.22	200	J

GLOSSARY OF PEST/PCB DATADATA QUALIFIERS

- U - Indicates that the compounds was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J - Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

RFW Batch Number: 9002L604

Client: NSRC GUNSITE 720

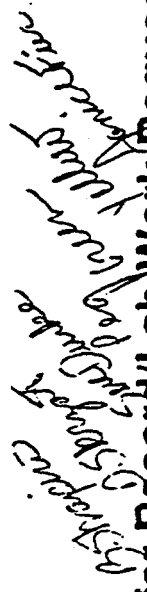
Work Order: 0630-28-13-0000

Page: 1

Cust ID: GS720 01 02 GS720 01 02 GS720 01 02 PBLK PBLK BS

Sample Information	RFW#:	001	001 REP	001 MS	90LE0272-MB2	90LE0272-MB2	SOIL	SOIL	SOIL	ug/Kg	ug/Kg	ug/Kg	184 *
Matrix:		SOIL	SOIL	SOIL									
D.F.:		1.00	1.00	1.00									
Units:		ug/Kg	ug/Kg	ug/Kg									
Surrogate: Di-n-butylchlorodane		175 *	128	162 *	158 *	184 *	fl	fl	fl	fl	fl	fl	fl
Alpha-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U							
Beta-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U							
Delta-BHC		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U							
gamma-BHC (Lindane)		8.4 U	8.6 U	62	8.0 U	140 *							
Heptachlor		8.4 U	8.6 U	75	8.0 U	85							
Aldrin		8.4 U	8.6 U	60	8.0 U	88							
Heptachlor epoxide		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U							
Endosulfan I		8.4 U	8.6 U	8.1 U	8.0 U	8.0 U							
Dieldrin		17 U	17 U	66	16 U	92							
4,4'-DDE		17 U	17 U	16	16 U	16 U							
Endrin		17 U	17 U	76	16 U	114							
Endosulfan II		17 U	17 U	16	16 U	16 U							
4,4'-DDD		17 U	17 U	16	16 U	16 U							
Endosulfan sulfate		17 U	17 U	16	16 U	16 U							
4,4'-DDT		17 U	4.3 J	95	16 U	143 *							
Methoxychlor		84 U	86 U	81 U	80 U	80 U							
Endrin aldehyde		17 U	17 U	16	16 U	16 U							
Kepon		17 U	17 U	16	16 U	16 U							
alpha-Chlordane		84 U	86 U	81 U	80 U	80 U							
gamma-Chlordane		84 U	86 U	81 U	80 U	80 U							
Toxaphene		170 U	170 U	160 U	160 U	160 U							
Aroclor-1016		84 U	86 U	81 U	80 U	80 U							
Aroclor-1221		84 U	86 U	81 U	80 U	80 U							
Aroclor-1232		84 U	86 U	81 U	80 U	80 U							
Aroclor-1242		84 U	86 U	81 U	80 U	80 U							
Aroclor-1248		84 U	86 U	81 U	80 U	80 U							
Aroclor-1254		170 U	170 U	160 U	160 U	160 U							
Aroclor-1260		170 U	170 U	160 U	160 U	160 U							
Isodrin		17 U	17 U	16	16 U	16 U							

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked.
 % = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. * = Outside of EPA CLP QC



51660120

Client W S R CONSULT 720
Work Order 0630-28-13600
Date Rec'd. 2/16/90 Date Due 3/28/90
RFW Contact _____
Client Contact/Phone _____

Resonance #1 2/26/90
Change 60BX to 608N
rtd Clinic request

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
red	Jed Cox	Shoond	2/1/80	9:30 AM					
red	Shoond	M. Kelly B.	2/2/80	09:30					
	M. Kelly B.	Shoond	2/2/80	3 —					
wet lab	Shoond	Shoond	2/2/80	8:40					
Hg (air)	Shoond	Kelly Niles	3/12/80	10:20					
No return	Kelly Niles	Shoond	3/12/80	19:00					

Resonance #1 2/26/90
Change 60BX to 608N
rtd Clinic request

Roy F. Weston, Inc. - Lionville Laboratory
 OPP ANALYTICAL DATA PACKAGE FOR
 WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LE0283	02/13/90	02/27/90	03/23/90

LAB QC:

PBLK	MB1	S	90LE0283	N/A	02/27/90	03/23/90
PBLK	MB1 BS	S	90LE0283	N/A	02/27/90	03/23/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02/16/90

NARRATIVE

The set of samples consisted of one soil sample collected on 02/13/90.

The samples were extracted on 02/27/90 and analyzed according to criteria set forth in Method 8140 for Appendix IX Organophosphorus Pesticide target compounds on 03/23/90.

All surrogate and blank spike recoveries are within QC limits.

No problems were encountered during sample analysis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-29-90
Date

GLOSSARY OF PEST/PCB DATADATA QUALIFIERS

- U - Indicates that the compounds was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J - Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

RPM Batch Number: 90021604

Client: NSRC GUNSITE 720

Work Order: 0630-28-13-0000

Page: 1

Roy F. Weston, Inc. - Knoxville Laboratory

ORTHOPHOSPHATE & PESTICIDES

Report Date: 03/26/90 10:24

Cust ID: GS720 01 02

PLK

PLK BS

Sample Information

RPM#: 001 90LE0283-MB1 90LE0283-MB1
Matrix: SOIL SOIL SOIL
D.F.: 0.500 0.500 0.500
Units: ug/Kg ug/Kg ug/Kg

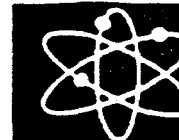
Surrogate:	Ethion	69	%	62	%	64	%
Diazinon		7.3	U	6.7	U	69	%
Methyl Parathion		7.3	U	6.7	U	60	%
O,O,O-Triethyl Phosphorothioate		36	U	33	U	33	U
Thionazin (zinophos)		36	U	33	U	33	U
Phorate		7.3	U	6.7	U	6.7	U
Sulfotepp		36	U	33	U	33	U
Diazofoton		7.3	U	6.7	U	6.7	U
Dimethoate		36	U	33	U	33	U
Ethyl Parathion		7.3	U	6.7	U	6.7	U
Famphur (Famophos)		73	U	67	U	67	U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not splked.
% = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. * = Outside of EPA CLP QC

CUSTOMER
ATTENTION
ADDRESS
CITY
W.O. NO.

Weston - SRP
Mark T. Carkhuff
208 Welsh Pool Rd.
Lionville, Pa 19353
E-1588
Lab Code : BE

602872



REPORT OF ANALYSIS

15-101

03/09/90

TYPE OF ANALYSIS

CUSTOMER ORDER NUMBER

SAMPLES RECEIVED

Customer Identification	DATE TIME ANALY.	Date Collected	Type of Analysis	ACTIVITY/ERROR	UNTS	ACCRCY	INST/INI
L603002 E1738	021490 1245	02/13-21	ALPHA	23.00 7.00	pCi/g	1.22	39 C A
L603002 E1738	021490 1245	02/13-21	BETA	4.00 4.00	pCi/g	1.13	39 C A
L603005 E1739	021490 1130	02/13-21	ALPHA	20.00 8.00	pCi/g	1.22	40 C A
L603005 E1739	021490 1130	02/13-21	BETA	4.00 4.00	pCi/g	1.13	40 C A
L603014 E1740	021390 1400	02/13-21	ALPHA	18.00 7.00	pCi/g	1.22	41 C A
L603014 E1740	021390 1400	02/13-21	BETA	4.00 3.00	pCi/g	1.13	41 C A
L606001 E1741	022090 1120	02/13-21	ALPHA	14.00 7.00	pCi/g	1.22	42 C A
L606001 i 41	022090 1120	02/13-21	BETA	0.00 3.00	pCi/g	1.13	42 C A
06002 E1742	022090 1230	02/13-21	ALPHA	21.00 7.00	pCi/g	1.22	43 C A
L606002 E1742	022090 1230	02/13-21	BETA	8.00 3.00	pCi/g	1.13	43 C A
L606003 E1743	022090 1430	02/13-21	ALPHA	30.00 8.00	pCi/g	1.22	44 C A
L606003 E1743	022090 1430	02/13-21	BETA	9.00 4.00	pCi/g	1.13	44 C A
L606011 E1744	041690 1510	02/13-21	ALPHA	22.00 8.00	pCi/g	1.22	45 C A
L606011 E1744	041690 1510	02/13-21	BETA	10.00 4.00	pCi/g	1.13	45 C A

☐ REPORTED VIA TELEPHONE

☐ FAX

PAGE 1 OF 1

MA Eberline
Thermo Analytical Inc.

7021 PAN AMERICAN FREEWAY, N.E.
ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 345-3461
FAX (505) 761-5416

APPROVED BY

R. Melgard
Rod Melgard, Mgr.

04-20-1990

DATE

B-129

CUSTOMER
ATTENTION
ADDRESS
CITY
W.O. NO.

weston - SRP
Mark T. Carkhuff
208 Welsh Pool Rd.
Lionville, Pa 19353
E-1589
Lab Code : BE



15-101

03/09/90

TYPE OF ANALYSIS

CUSTOMER ORDER NUMBER

SAMPLES RECEIVED

Customer Identification	DATE TIME ANALY.	Date Collected	Type of Analysis	ACTIVITY/ERROR	UNTS	ACCRCY	INST/INI
L606014 E1745	032790 1045	02/21/90	ALPHA	0.00 2.00	pCi/1	1.22	46 DDP
L606014 E1745	032790 1045	02/21/90	BETA	0.00 3.00	pCi/1	1.13	46 DDP

☐ REPORTED VIA TELEPHONE

☐ FAX

PAGE 1 OF 1

MA Eberline
Thermo Analytical Inc.

7021 PAN AMERICAN FREEWAY, N.E.
ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 345-3461
FAX (505) 761-5416

APPROVED BY

R. Melgard
Rod Melgard, Mgr.

04-20-1990

DATE

B-130



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-13

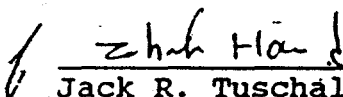
SAMPLES RECEIVED: 02-16-90

INORGANIC NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All preparation blanks were analyzed below the required detection limit.
2. All calibration verification checks were within the required control limits of 90-100%. Calibration verification is performed using independent standards.
3. All laboratory control standards (blank spikes) were within the control limits of 80-120%.
4. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).
5. USEPA-CLP SOW 787 was followed for the analysis of cyanide.

NOTE: For solid samples, all results are reported on a dry weight basis.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-21-90
Date

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-----	-----	-----	-----	-----	-----
-001	GS720 01 02	% SOLIDS	92.1	%	0.10
		CYANIDE, TOTAL	1.1 u	MG/KG	1.1
		SULFIDE	0.27 u	MG/KG	0.27

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK2	90LC082-MB2	CYANIDE, TOTAL	1.0 u	MG/KG	1.0
BLANK10	90LSD019-MB1	SULFIDE	0.25 u	MG/KG	0.25
BLANK20	90LSD019-MB2	SULFIDE	0.25 u	MG/KG	0.25
BLANK30	90LSD019-MB3	SULFIDE	0.25 u	MG/KG	0.25
BLANK40	90LSD019-MB4	SULFIDE	0.25 u	MG/KG	0.25

ROY F. WESTON INC.

INORGANICS ACCURACY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
BLANK10	90LSD019-MB1	SULFIDE	1.0	0.25u	1.0	102
BLANK20	90LSD019-MB2	SULFIDE	0.96	0.25u	1.0	95.9
BLANK30	90LSD019-MB3	SULFIDE	1.0	0.25u	1.0	101
BLANK40	90LSD019-MB4	SULFIDE	1.0	0.25u	1.0	102

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 03/14/90

SAMPLE -----	SITE ID -----	ANALYTE -----	SPIKED SAMPLE -----	SPIKED AMOUNT -----	UNITS -----	%RECOV -----
LCSS3	90LC082-LCS3	CYANIDE, TOTAL LCS	8.9	10.0	MG/KG	89.3
LCSS4	90LC082-LCS4	CYANIDE, TOTAL LCS	9.1	10.0	MG/KG	91.4

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02						
% SOLIDS	001	S	90LS039	02/13/90	03/07/90	03/08/90
TOTAL CYANIDE	001	S	90LC082	02/13/90	02/25/90	02/26/90
SULFIDE	001	S	90LSD019	02/13/90	03/12/90	03/12/90

LAB QC:

TOTAL CYANIDE	CCB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	CCV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	ICB	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	ICV L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	LCS L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	LCS L	W	90LC082	N/A	02/25/90	02/26/90
TOTAL CYANIDE	MB2	W	90LC082	N/A	02/25/90	02/26/90
SULFIDE	MB1	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB1 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB2	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB2 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB3	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB3 BS	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB4	W	90LSD019	N/A	03/12/90	03/12/90
SULFIDE	MB4 BS	W	90LSD019	N/A	03/12/90	03/12/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604
W.O. #: 0630-28-10

SAMPLES RECEIVED: 02-16-90

METALS NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met for water samples. Note: Holding times for soil samples have not been promulgated by the USEPA.
2. All calibration verification checks were within the required control limits of 90-100% (85-115% for Hg). Calibration verification is performed using independent standards from Inorganic Ventures, Inc.
3. All preparation blanks were analyzed below the required detection limit.
4. Laboratory control standards were within the control limits of 80-120% with the exception of silver (59%) for site ID# 90L0226-LC1. The blank spike reproducibility was outside the 20% window for silver at 58%.

Note: The USEPA-CLP has dropped control limits for silver and antimony due to documented difficulties in obtaining reliable results. WESTON Analytics has adopted the same policy.

5. The analytical methods applied by the laboratory for the determination of metals are:

As: EPA 206.2
Se: EPA 270.2
Pb: EPA 239.2
Tl: EPA 279.2

Hg: EPA 245.1
ICP Scan: EPA 200.7
All Others: EPA 200.7
EP Leachates (except Hg): 200.7

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-9-90
Date

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	GS720 01 02	SILVER, TOTAL	1.7 u	MG/KG	1.7
		ARSENIC, TOTAL	1.7 u	MG/KG	1.7
		BARIUM, TOTAL	34.8 u	MG/KG	34.8
		BERYLLIUM, TOTAL	0.87 u	MG/KG	0.87
		CADMIUM, TOTAL	0.87 u	MG/KG	0.87
		COBALT, TOTAL	8.7 u	MG/KG	8.7
		CHROMIUM, TOTAL	3.2	MG/KG	1.7
		COPPER, TOTAL	4.4 u	MG/KG	4.4
		MERCURY, TOTAL	0.12	MG/KG	0.11
		NICKEL, TOTAL	7.0 u	MG/KG	7.0
		LEAD, TOTAL	5.6	MG/KG	0.52
		ANTIMONY, TOTAL	10.4 u	MG/KG	10.4
		SELENIUM, TOTAL	0.87 u	MG/KG	0.87
		TIN, TOTAL	25.7	MG/KG	17.4
		THALLIUM, TOTAL	1.7 u	MG/KG	1.7
		VANADIUM, TOTAL	8.7 u	MG/KG	8.7
		ZINC, TOTAL	88.7	MG/KG	3.5

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK1	90L0226-MB1	SILVER, TOTAL	2.0	u MG/KG	2.0
		BARIUM, TOTAL	40.0	u MG/KG	40.0
		BERYLLIUM, TOTAL	1.0	u MG/KG	1.0
		CADMIUM, TOTAL	1.0	u MG/KG	1.0
		COBALT, TOTAL	10.0	u MG/KG	10.0
		CHROMIUM, TOTAL	2.0	u MG/KG	2.0
		COPPER, TOTAL	5.0	u MG/KG	5.0
		NICKEL, TOTAL	8.0	u MG/KG	8.0
		ANTIMONY, TOTAL	12.0	u MG/KG	12.0
		TIN, TOTAL	20.0	u MG/KG	20.0
		VANADIUM, TOTAL	10.0	u MG/KG	10.0
		ZINC, TOTAL	4.0	u MG/KG	4.0
BLANK1	90L0225-MB1	ARSENIC, TOTAL	2.0	u MG/KG	2.0
		LEAD, TOTAL	0.60	u MG/KG	0.60
		SELENIUM, TOTAL	1.0	u MG/KG	1.0
		THALLIUM, TOTAL	2.0	u MG/KG	2.0
BLANK1	90C040B-MB1	MERCURY, TOTAL	0.10	u MG/KG	0.10
BLANK2	90C040B-MB2	MERCURY, TOTAL	0.10	u MG/KG	0.10
BLANK3	90C040B-MB3	MERCURY, TOTAL	0.10	u MG/KG	0.10
BLANK4	90C040B-MB4	MERCURY, TOTAL	0.10	u MG/KG	0.10

ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L604

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LCS2	90L0226-LC2	SILVER, LCS	59.0	107	57.6
		BARIUM, LCS	102	101	0.74
		BERYLLIUM, LCS	107	108	1.3
		CADMIUM, LCS	106	106	0.30
		COBALT, LCS	104	104	0.029
		CHROMIUM, LCS	112	111	0.50
		COPPER, LCS	109	110	0.95
		NICKEL, LCS	104	105	0.48
		ANTIMONY, LCS	93.1	93.7	0.64
		TIN, LCS	92.6	93.0	0.41
		VANADIUM, LCS	116	118	1.7
		ZINC, LCS	103	103	0.058
LCS2	90L0225-LC2	ARSENIC, LCS	94.0	97.7	3.8
		LEAD, LCS	113	112	0.89
		SELENIUM, LCS	111	113	1.5
		THALLIUM, LCS	107	109	1.2
LCS2	90C040B-LC2	MERCURY, LCS	106	103	3.4

ROY P. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	90L0226-LC1	SILVER, LCS	59.0	100	MG/KG	59.0
		BARIUM, LCS	1020	1000	MG/KG	102
		BERYLLIUM, LCS	53.3	50.0	MG/KG	107
		CADMIUM, LCS	53.1	50.0	MG/KG	106
		COBALT, LCS	520	500	MG/KG	104
		CHROMIUM, LCS	112	100	MG/KG	112
		COPPER, LCS	271	250	MG/KG	109
		NICKEL, LCS	417	400	MG/KG	104
		ANTIMONY, LCS	559	600	MG/KG	93.1
		TIN, LCS	926	1000	MG/KG	92.6
		VANADIUM, LCS	580	500	MG/KG	116
		ZINC, LCS	205	200	MG/KG	103
LCS2	90L0226-LC2	SILVER, LCS	107	100	MG/KG	107
		BARIUM, LCS	1010	1000	MG/KG	101
		BERYLLIUM, LCS	54.1	50.0	MG/KG	108
		CADMIUM, LCS	53.0	50.0	MG/KG	106
		COBALT, LCS	520	500	MG/KG	104
		CHROMIUM, LCS	111	100	MG/KG	111
		COPPER, LCS	274	250	MG/KG	110
		NICKEL, LCS	419	400	MG/KG	105
		ANTIMONY, LCS	562	600	MG/KG	93.7
		TIN, LCS	930	1000	MG/KG	93.0
		VANADIUM, LCS	590	500	MG/KG	118
		ZINC, LCS	206	200	MG/KG	103
LCS1	90L0225-LC1	ARSENIC, LCS	5.6	6.0	MG/KG	94.0
		LEAD, LCS	6.8	6.0	MG/KG	113
		SELENIUM, LCS	6.7	6.0	MG/KG	111
		THALLIUM, LCS	6.4	6.0	MG/KG	107
LCS2	90L0225-LC2	ARSENIC, LCS	5.9	6.0	MG/KG	97.7
		LEAD, LCS	6.7	6.0	MG/KG	112
		SELENIUM, LCS	6.8	6.0	MG/KG	113
		THALLIUM, LCS	6.5	6.0	MG/KG	109
LCS1	90C040B-LC1	MERCURY, LCS	1.1	1.0	MG/KG	106
LCS2	90C040B-LC2	MERCURY, LCS	1.0	1.0	MG/KG	103
LCS3	90C040B-LC3	MERCURY, LCS	1.1	1.0	MG/KG	110

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE *****	SITE ID *****	ANALYTE *****	SPIKED SAMPLE *****	SPIKED AMOUNT *****	UNITS *****	%RECOV *****
LCS4	90C040B-LC4	MERCURY, LCS	1.1	1.0	MG/KG	114

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT #: 9002L604

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02						
SILVER, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	001	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
BERYLLIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
COBALT, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
COPPER, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	001	S	90C040B	02/13/90	03/12/90	03/13/90
NICKEL, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
LEAD, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/05/90
ANTIMONY, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
SELENIUM, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/01/90
TIN, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
THALLIUM, TOTAL	001	S	90L0225	02/13/90	03/09/90	04/04/90
VANADIUM, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90
ZINC, TOTAL	001	S	90L0226	02/13/90	03/09/90	03/23/90

LAB QC:

SILVER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90

Roy P. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BARIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COBALT, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COPPER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
NICKEL, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
TIN, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ZINC, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ARSENIC LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC, TOTAL	MB1	S	90L0225	N/A	03/09/90	03/30/90
LEAD, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/04/90
MERCURY LABORATORY	LC1 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB1	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040B	N/A	03/12/90	03/13/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L603
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

METALS NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met for water samples. Note: Holding times for soil samples have not been promulgated by the USEPA.
2. All calibration verification checks were within the required control limits of 90-100% (85-115% for Hg). Calibration verification is performed using independent standards from Inorganic Ventures, Inc.
3. All preparation blanks were analyzed below the required detection limit.
4. Laboratory control standards were within the control limits of 80-120% with the exception of silver (59%) for site ID# 90L0226-LC1 and (127%) for site ID# 90L0219-LC1. The blank spike reproducibility was outside the 20% window for silver at 58%.

Note: The USEPA-CLP has dropped control limits for silver and antimony due to documented difficulties in obtaining reliable results. WESTON Analytics has adopted the same policy.

5. The analytical methods applied by the laboratory for the determination of metals are:

As: EPA 206.2	Hg: EPA 245.1
Se: EPA 270.2	ICP Scan: EPA 200.7
Pb: EPA 239.2	All Others: EPA 200.7
Tl: EPA 279.2	EP Leachates (except Hg): 200.7

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-9-90
Date

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

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ABBREVIATIONS

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LABORATORY CHRONOLOGY AND HOLDTIME REPORT

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- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	GS720 10-01E	SILVER, TOTAL	10.0	u UG/L	10.0
		ARSENIC, TOTAL	10.0	u UG/L	10.0
		BARIUM, TOTAL	200	u UG/L	200
		CADMIUM, TOTAL	5.0	u UG/L	5.0
		CHROMIUM, TOTAL	10.0	u UG/L	10.0
		MERCURY, TOTAL	0.20	u UG/L	0.20
		LEAD, TOTAL	3.0	u UG/L	3.0
		SELENIUM, TOTAL	5.0	u UG/L	5.0
-002	GS720 14-01	SILVER, TOTAL	1.6	u MG/KG	1.6
		ARSENIC, TOTAL	1.9	u MG/KG	1.9
		BARIUM, TOTAL	32.1	u MG/KG	32.1
		CADMIUM, TOTAL	0.80	u MG/KG	0.80
		CHROMIUM, TOTAL	3.0	u MG/KG	1.6
		MERCURY, TOTAL	0.11	u MG/KG	0.11
		LEAD, TOTAL	2.6	u MG/KG	0.58
		SELENIUM, TOTAL	0.97	u MG/KG	0.97
-003	GS720 04-01	SILVER, TOTAL	1.8	u MG/KG	1.8
		ARSENIC, TOTAL	1.7	u MG/KG	1.7
		BARIUM, TOTAL	37.0	u MG/KG	37.0
		CADMIUM, TOTAL	0.92	u MG/KG	0.92
		CHROMIUM, TOTAL	3.0	u MG/KG	1.8
		MERCURY, TOTAL	0.11	u MG/KG	0.11
		LEAD, TOTAL	6.8	u MG/KG	0.50
		SELENIUM, TOTAL	0.83	u MG/KG	0.83
-004	GS720 02-01	SILVER, TOTAL	1.9	u MG/KG	1.9
		ARSENIC, TOTAL	1.8	u MG/KG	1.8
		BARIUM, TOTAL	38.3	u MG/KG	38.3
		CADMIUM, TOTAL	0.96	u MG/KG	0.96
		CHROMIUM, TOTAL	2.7	u MG/KG	1.9
		MERCURY, TOTAL	0.10	u MG/KG	0.10
		LEAD, TOTAL	2.8	u MG/KG	0.55
		SELENIUM, TOTAL	0.92	u MG/KG	0.92

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	GS720 03-01	SILVER, TOTAL	2.1 u	MG/KG	2.1
		ARSENIC, TOTAL	2.0 u	MG/KG	2.0
		BARIUM, TOTAL	41.8 u	MG/KG	41.8
		CADMIUM, TOTAL	1.0 u	MG/KG	1.0
		CHROMIUM, TOTAL	2.9	MG/KG	2.1
		MERCURY, TOTAL	0.11 u	MG/KG	0.11
		LEAD, TOTAL	2.2	MG/KG	0.60
		SELENIUM, TOTAL	1.0 u	MG/KG	1.0
-011	GS720 01-02	SILVER, TOTAL	1.6 u	MG/KG	1.6
		ARSENIC, TOTAL	1.7 u	MG/KG	1.7
		BARIUM, TOTAL	31.8 u	MG/KG	31.8
		CADMIUM, TOTAL	0.80 u	MG/KG	0.80
		CHROMIUM, TOTAL	6.1	MG/KG	1.6
		MERCURY, TOTAL	0.12	MG/KG	0.11
		LEAD, TOTAL	3.9	MG/KG	0.52
		SELENIUM, TOTAL	0.87 u	MG/KG	0.87
-014	GS720 01-01	SILVER, TOTAL	2.0 u	MG/KG	2
		ARSENIC, TOTAL	2.2 u	MG/KG	2.2
		BARIUM, TOTAL	53.9	MG/KG	39.6
		CADMIUM, TOTAL	0.99 u	MG/KG	0.99
		CHROMIUM, TOTAL	4.0	MG/KG	2.0
		MERCURY, TOTAL	0.11 u	MG/KG	0.11
		LEAD, TOTAL	4.4	MG/KG	0.65
		SELENIUM, TOTAL	1.1 u	MG/KG	1.1

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK1	90L0219-MB1	SILVER, TOTAL	10.0 u	UG/L	10.0
		BARIUM, TOTAL	200 u	UG/L	200
		CADMIUM, TOTAL	5.0 u	UG/L	5.0
		CHROMIUM, TOTAL	10.0 u	UG/L	10.0
BLANK1	90L0218-MB1	ARSENIC, TOTAL	10.0 u	UG/L	10.0
		LEAD, TOTAL	3.0 u	UG/L	3.0
		SELENIUM, TOTAL	5.0 u	UG/L	5.0
BLANK1	90C040A-MB1	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK2	90C040A-MB2	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK3	90C040A-MB3	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK4	90C040A-MB4	MERCURY, TOTAL	0.20 u	UG/L	0.20
BLANK1	90L0226-MB1	SILVER, TOTAL	2.0 u	MG/KG	2.0
		BARIUM, TOTAL	40.0 u	MG/KG	40.0
		CADMIUM, TOTAL	1.0 u	MG/KG	1.0
		CHROMIUM, TOTAL	2.0 u	MG/KG	2.0
BLANK1	90L0225-MB1	ARSENIC, TOTAL	2.0 u	MG/KG	2.0
		LEAD, TOTAL	0.60 u	MG/KG	0.60
		SELENIUM, TOTAL	1.0 u	MG/KG	1.0
BLANK1	90C040B-MB1	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK2	90C040B-MB2	MERCURY, TOTAL	0.10 u	MG/KG	0.10

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ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK3	90C040B-MB3	MERCURY, TOTAL	0.10 u	MG/KG	0.10
BLANK4	90C040B-MB4	MERCURY, TOTAL	0.10 u	MG/KG	0.10

ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 04/09/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
LCS2	90L0219-LC2	SILVER, LCS	127	119	6.0
		BARIUM, LCS	102	101	1.2
		CADMIUM, LCS	115	111	3.4
		CHROMIUM, LCS	120	116	3.3
LCS2	90L0218-LC2	ARSENIC, LCS	87.0	90.7	4.1
		LEAD, LCS	105	104	0.95
		SELENIUM, LCS	110	113	2.7
LCS2	90C040A-LC2	MERCURY, LCS	106	103	3.4
LCS2	90L0226-LC2	SILVER, LCS	59.0	107	57.6
		BARIUM, LCS	102	101	0.74
		CADMIUM, LCS	106	106	0.30
		CHROMIUM, LCS	112	111	0.50
LCS2	90L0225-LC2	ARSENIC, LCS	94.0	97.7	3.8
		LEAD, LCS	113	112	0.89
		SELENIUM, LCS	111	113	1.5
LCS2	90C040B-LC2	MERCURY, LCS	106	103	3.4

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE =====	SITE ID =====	ANALYTE =====	SPIKED SAMPLE =====	SPIKED AMOUNT =====	UNITS =====	%RECOV =====
LCS1	90L0219-LC1	SILVER, LCS	633	500	UG/L	127
		BARIUM, LCS	5100	5000	UG/L	102
		CADMIUM, LCS	287	250	UG/L	115
		CHROMIUM, LCS	599	500	UG/L	120
LCS2	90L0219-LC2	SILVER, LCS	596	500	UG/L	119
		BARIUM, LCS	5040	5000	UG/L	101
		CADMIUM, LCS	278	250	UG/L	111
		CHROMIUM, LCS	580	500	UG/L	116
LCS1	90L0218-LC1	ARSENIC, LCS	26.1	30.0	UG/L	87.0
		LEAD, LCS	31.6	30.0	UG/L	105
		SELENIUM, LCS	33.1	30.0	UG/L	110
LCS2	90L0218-LC2	ARSENIC, LCS	27.2	30.0	UG/L	90.7
		LEAD, LCS	31.3	30.0	UG/L	104
		SELENIUM, LCS	34.0	30.0	UG/L	113
LCS1	90C040A-LC1	MERCURY, LCS	2.1	2.0	UG/L	106
LCS2	90C040A-LC2	MERCURY, LCS	2.1	2.0	UG/L	103
LCS3	90C040A-LC3	MERCURY, LCS	2.2	2.0	UG/L	110
LCS4	90C040A-LC4	MERCURY, LCS	2.3	2.0	UG/L	114
LCS1	90L0226-LC1	SILVER, LCS	59.0	100	MG/KG	59.0
		BARIUM, LCS	1020	1000	MG/KG	102
		CADMIUM, LCS	53.1	50.0	MG/KG	106
		CHROMIUM, LCS	112	100	MG/KG	112
LCS2	90L0226-LC2	SILVER, LCS	107	100	MG/KG	107
		BARIUM, LCS	1010	1000	MG/KG	101
		CADMIUM, LCS	53.0	50.0	MG/KG	106
		CHROMIUM, LCS	111	100	MG/KG	111

ROY F. WESTON INC.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 04/09/90

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	90L0225-LC1	ARSENIC, LCS	5.6	6.0	MG/KG	94.0
		LEAD, LCS	6.8	6.0	MG/KG	113
		SELENIUM, LCS	6.7	6.0	MG/KG	111
LCS2	90L0225-LC2	ARSENIC, LCS	5.9	6.0	MG/KG	97.7
		LEAD, LCS	6.7	6.0	MG/KG	112
		SELENIUM, LCS	6.8	6.0	MG/KG	113
LCS1	90C040B-LC1	MERCURY, LCS	1.1	1.0	MG/KG	106
LCS2	90C040B-LC2	MERCURY, LCS	1.0	1.0	MG/KG	103
LCS3	90C040B-LC3	MERCURY, LCS	1.1	1.0	MG/KG	110
LCS4	90C040B-LC4	MERCURY, LCS	1.1	1.0	MG/KG	114

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT #: 9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
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GS720 10-01E

SILVER, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
ARSENIC, TOTAL	001	W	90L0218	02/14/90	03/08/90	03/30/90
BARIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
CADMIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
CHROMIUM, TOTAL	001	W	90L0219	02/14/90	03/08/90	03/23/90
MERCURY, TOTAL	001	W	90C040A	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	001	W	90L0218	02/14/90	03/08/90	04/05/90
SELENIUM, TOTAL	001	W	90L0218	02/14/90	03/08/90	04/02/90

GS720 14-01

SILVER, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	002	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	002	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	002	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	002	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	002	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 04-01

SILVER, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	003	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	003	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	003	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	003	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	003	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 02-01

SILVER, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	004	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
CHROMIUM, TOTAL	004	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	004	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	004	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	004	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 03-01

SILVER, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
ARSENIC, TOTAL	005	S	90L0225	02/14/90	03/09/90	03/30/90
BARIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
CADMIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
CHROMIUM, TOTAL	005	S	90L0226	02/14/90	03/09/90	03/23/90
MERCURY, TOTAL	005	S	90C040B	02/14/90	03/12/90	03/13/90
LEAD, TOTAL	005	S	90L0225	02/14/90	03/09/90	04/05/90
SELENIUM, TOTAL	005	S	90L0225	02/14/90	03/09/90	04/01/90

GS720 01-02

SILVER, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	011	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	011	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	011	S	90C040B	02/13/90	03/12/90	03/13/90
LEAD, TOTAL	011	S	90L0225	02/13/90	03/09/90	04/05/90
SELENIUM, TOTAL	011	S	90L0225	02/13/90	03/09/90	04/01/90

GS720 01-01

SILVER, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
ARSENIC, TOTAL	014	S	90L0225	02/13/90	03/09/90	03/30/90
BARIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
CADMIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
CHROMIUM, TOTAL	014	S	90L0226	02/13/90	03/09/90	03/23/90
MERCURY, TOTAL	014	S	90C040B	02/13/90	03/12/90	03/13/90
LEAD, TOTAL	014	S	90L0225	02/13/90	03/09/90	04/05/90
SELENIUM, TOTAL	014	S	90L0225	02/13/90	03/09/90	04/01/90

LAB QC:

SILVER LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
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Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT #: 9002L603

CLIENT ID / ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BARIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	W	90L0219	N/A	03/08/90	03/23/90
SILVER LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
BARIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM LABORATORY	LC2 BS	W	90L0219	N/A	03/08/90	03/23/90
SILVER, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
BARIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
CADMIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
CHROMIUM, TOTAL	MB1	W	90L0219	N/A	03/08/90	03/23/90
ARSENIC LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	03/30/90
LEAD LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM LABORATORY	LC1 BS	W	90L0218	N/A	03/08/90	04/02/90
ARSENIC LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	03/30/90
LEAD LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM LABORATORY	LC2 BS	W	90L0218	N/A	03/08/90	04/02/90
ARSENIC, TOTAL	MB1	W	90L0218	N/A	03/08/90	03/30/90
LEAD, TOTAL	MB1	W	90L0218	N/A	03/08/90	04/05/90
SELENIUM, TOTAL	MB1	W	90L0218	N/A	03/08/90	04/02/90
MERCURY LABORATORY	LC1 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB1	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040A	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040A	N/A	03/12/90	03/13/90
SILVER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC1 BS	S	90L0226	N/A	03/09/90	03/23/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SILVER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BARIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COBALT LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
COPPER LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
NICKEL LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
TIN LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
ZINC LABORATORY	LC2 BS	S	90L0226	N/A	03/09/90	03/23/90
SILVER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BARIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
BERYLLIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CADMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COBALT, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
CHROMIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
COPPER, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
NICKEL, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ANTIMONY, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
TIN, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
VANADIUM, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ZINC, TOTAL	MB1	S	90L0226	N/A	03/09/90	03/23/90
ARSENIC LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC1 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	03/30/90
LEAD LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM LABORATORY	LC2 BS	S	90L0225	N/A	03/09/90	04/04/90
ARSENIC, TOTAL	MB1	S	90L0225	N/A	03/09/90	03/30/90
LEAD, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/05/90
SELENIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/01/90
THALLIUM, TOTAL	MB1	S	90L0225	N/A	03/09/90	04/04/90
MERCURY LABORATORY	LC1 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC2 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC3 BS	W	90C040B	N/A	03/12/90	03/13/90
MERCURY LABORATORY	LC4 BS	W	90C040B	N/A	03/12/90	03/13/90

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY, TOTAL	MB1	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB2	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB3	W	90C040B	N/A	03/12/90	03/13/90
MERCURY, TOTAL	MB4	W	90C040B	N/A	03/12/90	03/13/90

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 10-01E	001	W	90LVK031	02/14/90	N/A	02/26/90
GS720 14-01	002	S	90LVW029	02/14/90	N/A	02/26/90
GS720 04-01	003	S	90LVW027	02/14/90	N/A	02/23/90
GS720 02-01	004	S	90LVW027	02/14/90	N/A	02/23/90
GS720 03-01	005	S	90LVW027	02/14/90	N/A	02/23/90
GS720 02-01A	006	S	90LVW027	02/14/90	N/A	02/23/90
GS720 11-01E	007	W	90LVK031	02/14/90	N/A	02/26/90
GS720 06-01	008	S	90LVW027	02/14/90	N/A	02/23/90
GS720 05-01	009	S	90LVW027	02/14/90	N/A	02/23/90
GS720 12-01B	010	W	90LVK031	02/14/90	N/A	02/26/90
GS720 01-02	011	S	90LVW028	02/13/90	N/A	02/24/90
GS720 08-01	012	S	90LVW028	02/13/90	N/A	02/24/90
GS720 07-01	013	S	90LVW030	02/13/90	N/A	02/27/90
GS720 01-01	014	S	90LVW028	02/13/90	N/A	02/24/90

LAB QC:

VBLK	MB1	W	90LVK031	N/A	N/A	02/26/90
VBLK	MB1	S	90LVW029	N/A	N/A	02/26/90
VBLK	MB1	S	90LVW027	N/A	N/A	02/23/90
VBLK	MB1	S	90LVW028	N/A	N/A	02/24/90
VBLK	MB1	S	90LVW030	N/A	N/A	02/27/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC-GUNSITE 720
RFW #: 9002L603, GC/MS VOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of three water samples and eleven soil samples collected on 02-13,14-90.

The samples were analyzed according to criteria set forth in SW 846 Method 8240 for TCL Volatile target compounds on 02-23,24,26,27-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were not detected in these samples.
2. All surrogate recoveries are within EPA QC limits.

for Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-3-90
Date

DATA QUALIFIERS

- U - Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E - Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I - Interference.
- X - Additional qualifiers used as required are explained in the case narrative.
- NQ - Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS - Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD - Indicates blank spike duplicate.
- MS - Indicates matrix spike.
- MSD - Indicates matrix spike duplicate.
- DL - Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA - Not applicable.
- DF - Dilution factor.
- NR - Not required.

Cust ID: GS720 10-01R GS720 14-01 GS720 04-01 GS720 02-01 GS720 03-01 GS720 02-01A

Sample Information	RFM#:	001	002	003	004	005	006
Matrix:	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Units:	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate	Toluene-d8	110	99	103	106	104	102
Recovery	Bromofluorobenzene	99	97	101	104	102	105
	1,2-Dichloroethane-d4	99	91	94	93	96	100
Chloromethane		10 U	11 U	10 U	11 U	11 U	10 U
Bromomethane		10 U	11 U	10 U	11 U	11 U	10 U
Vinyl Chloride		5 J	11 U	10 U	11 U	11 U	10 U
Chloroethane		10 U	11 U	10 U	11 U	11 U	10 U
Methylene Chloride		3 JB	11 B	9 B	11 B	8 B	8 B
Acetone		10 U	17 B	12 B	13 B	13 B	14 B
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane (total)		20	5 U	5 U	5 U	5 U	5 U
Chloroform		5 U	5 U	1 JB	5 U	5 U	1 JB
1,2-Dichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone		10 U	11 U	10 U	11 U	11 U	10 U
1,1,1-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride		5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate		10 U	11 U	10 U	11 U	11 U	10 U
Bromodichloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethane		6	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	5 U	5 U	5 U	5 U	5 U
Benzene		5 U	5 U	5 U	5 U	5 U	5 U
Trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U	5 U
Bromoform		5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone		10 U	11 U	10 U	11 U	11 U	10 U
2-Hexanone		10 U	11 U	10 U	11 U	11 U	10 U
Tetrachloroethene		5	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U	5 U

* = Outside of EPA CLP GC limits.

RFW#:	001	002	003	004	005	006
Toluene	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	5 U	5 U	5 U	5 U	5 U	5 U

*- Outside of EPA CLP GC limits.

Cust ID: GS720 11-01E GS720 06-01 GS720 05-01 GS720 12-01B GS720 01-02 GS720 08-01

Sample Information	RFW#:	007	008	009	010	011	012
Matrix:	WATER		SOIL	SOIL	WATER	SOIL	SOIL
D.F.:	1.00	1.00	1.00	1.00	1.00	1.00	0.986
Units:	ug/L	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Toluene-d8	113 *	104 %	101 %	114 *	106 %	100 %
	Bromofluorobenzene	101 %	107 %	104 %	101 %	100 %	99 %
	1,2-Dichloroethane-d4	105 %	96 %	95 %	101 %	108 %	97 %
Chloromethane		10 U	12 U	11 U	10 U	11 U	12 U
Bromomethane		10 U	12 U	11 U	10 U	11 U	12 U
Vinyl Chloride		2 J	12 U	11 U	10 U	11 U	12 U
Chloroethane		10 U	12 U	11 U	10 U	11 U	12 U
Methylene Chloride		4 JB	8 B	8 B	6 B	9 B	10 B
Acetone		4 J	17 B	12 B	10 U	24 B	16 B
Carbon Disulfide		2 JB	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethane (total)		8	6 U	5 U	1 J	5 U	6 U
Chloroform		5 U	2 JB	1 JB	5 U	5 U	6 U
1,2-Dichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
2-Butanone		10 U	12 U	11 U	10 U	11 U	12 U
1,1,1-Trichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
Carbon Tetrachloride		5 U	6 U	5 U	5 U	5 U	6 U
Vinyl Acetate		10 U	12 U	11 U	10 U	11 U	12 U
Bromodichloromethane		5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloropropane		5 U	6 U	5 U	5 U	5 U	6 U
cis-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U	6 U
Trichloroethene		2 J	6 U	5 U	5 U	5 U	6 U
Dibromochloromethane		5 U	6 U	5 U	5 U	5 U	6 U
1,1,2-Trichloroethane		5 U	6 U	5 U	5 U	5 U	6 U
Benzene		5 U	6 U	5 U	5 U	5 U	6 U
Trans-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U	6 U
Bromoform		5 U	6 U	5 U	5 U	5 U	6 U
4-Methyl-2-pentanone		10 U	12 U	11 U	10 U	11 U	12 U
2-Hexanone		10 U	12 U	11 U	10 U	11 U	12 U
Tetrachloroethene		2 J	6 U	5 U	5 U	5 U	6 U
1,1,2,2-Tetrachloroethane		5 U	6 U	5 U	5 U	5 U	6 U

* Outside of EPA CLP QC Limits.

002878

RFW#:	007	008	009	010	011	012
Toluene	5 U	6 U	5 U	5 U	5 U	6 U
Chlorobenzene	5 U	6 U	5 U	5 U	5 U	6 U
Ethylbenzene	5 U	6 U	5 U	5 U	5 U	6 U
Styrene	5 U	6 U	5 U	5 U	5 U	6 U
Xylene (total)	5 U	6 U	5 U	5 U	5 U	6 U

** Outside of EPA CUP GC limits.

Sample Information		RFW#:	013	014	90LVK031-MB1	90LVW029-MB1	90LVW027-MB1	90LVW028-MB1
Matrix:		SOIL	SOIL	WATER	SOIL	SOIL	SOIL	SOIL
D.F.:		1.06	0.988	1.00	1.00	1.00	1.00	1.00
Units:		ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery		Toluene-d8	104 %	108 %	110 %	101 %	102 %	99 %
		Bromofluorobenzene	107 %	88 %	102 %	102 %	103 %	101 %
		1,2-Dichloroethane-d4	105 %	102 %	105 %	96 %	112 %	96 %
Chloromethane			13 U	11 U	10 U	10 U	10 U	10 U
Bromomethane			13 U	11 U	10 U	10 U	10 U	10 U
Vinyl Chloride			13 U	11 U	10 U	10 U	10 U	10 U
Chloroethane			13 U	11 U	10 U	10 U	10 U	10 U
Methylene Chloride			14 B	10 B	4 J	11	11	8
Acetone			12 JB	24 B	10 U	13	13	13
Carbon Disulfide			6 U	6 U	1 J	5 U	5 U	5 U
1,1-Dichloroethene			6 U	6 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane			6 U	6 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)			6 U	6 U	5 U	5 U	5 U	5 U
Chloroform			1 JB	6 U	5 U	5 U	1 J	5 U
1,2-Dichloroethane			6 U	6 U	5 U	5 U	5 U	5 U
2-Butanone			13 U	11 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane			6 U	6 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride			6 U	6 U	5 U	5 U	5 U	5 U
Vinyl Acetate			13 U	11 U	10 U	10 U	10 U	10 U
Bromodichloromethane			6 U	6 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane			6 U	6 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene			6 U	6 U	5 U	5 U	5 U	5 U
Trichloroethene			6 U	6 U	5 U	5 U	5 U	5 U
Dibromochloromethane			6 U	6 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane			6 U	6 U	5 U	5 U	5 U	5 U
Benzene			6 U	6 U	5 U	5 U	5 U	5 U
Trans-1,3-Dichloropropene			6 U	6 U	5 U	5 U	5 U	5 U
Bromoform			6 U	6 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone			13 U	11 U	10 U	10 U	5 J	10 U
2-Hexanone			13 U	11 U	10 U	10 U	6 J	10 U
Tetrachloroethene			6 U	6 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane			6 U	6 U	5 U	5 U	1 J	5 U

RFW# 013 014 90LVK031-MB1 90LVW029-MB1 90LVW027-MB1 90LVW028-MB1

Toluene	6 U	6 U	5 U	5 U	5 U	5 U
Chlorobenzene	6 U	6 U	5 U	5 U	5 U	5 U
Ethylbenzene	6 U	6 U	5 U	5 U	5 U	5 U
Styrene	6 U	6 U	5 U	5 U	5 U	5 U
Xylene (total)	6 U	6 U	5 U	5 U	5 U	5 U

** Outside of EPA CLP GC limits.

RPM Date Number: 9002L603

roy f. Weston, Inc. - Lionville Laboratory
Volatiles by MS, HSL List

Client: MSRC GUNSITE 720 Work Order: 0630-28-13-0000 Report Date: 03/26/90 5:49 Page: 48

Cust ID: VBLK

Sample Information

RPM#: 90LW030-MBI
Matrix: SOIL
D.F.: 1.00
Units: ug/Kg

Burrogate	Toluene-d8	105	%
Recovery	Bromofluorobenzene	105	%
	1,2-Dichloroethane-d4	107	%
Chloromethane		10	U
Bromomethane		10	U
Vinyl Chloride		10	U
Chloroethane		10	U
Methylene Chloride		9	
Acetone		16	
Carbon Disulfide		5	U
1,1-Dichloroethene		5	U
1,1-Dichloroethane		5	U
1,2-Dichloroethene (total)		5	U
Chloroform		1	J
1,2-Dichloroethane		5	U
2-Butanone		10	U
1,1,1-Trichloroethane		5	U
Carbon Tetrachloride		5	U
Vinyl Acetate		10	U
Bromodichloromethane		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
Trichloroethene		5	U
Dibromochloromethane		5	U
1,1,2-Trichloroethane		5	U
Benzene		5	U
Trans-1,3-Dichloropropene		5	U
Bromoform		5	U
4-Methyl-2-pentanone		4	J
2-Hexanone		10	U
Tetrachloroethene		5	U
1,1,2,2-Tetrachloroethane		5	U

** Outside of EPA CLP GC limits.

Toluene	5	U
Chlorobenzene	5	U
Ethylbenzene	5	U
Styrene	5	U
Xylene (total)	5	U
** Outside of EPA CLP GC limits.		

Roy F. Weston, Inc. - Lionville Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 14-01	002	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 02-01	004	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 02-01A	006	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 06-01	008	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 05-01	009	S	90LE0272	02/14/90	02/26/90	03/08/90
GS720 01-02	011	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 08-01	012	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 07-01	013	S	90LE0272	02/13/90	02/26/90	03/09/90
GS720 01-01	014	S	90LE0272	02/13/90	02/26/90	03/09/90

LAB QC:

SBLK	MB1	S	90LE0272	N/A	02/26/90	03/07/90
SBLK	MB1 BS	S	90LE0272	N/A	02/26/90	03/07/90



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC-GUNSITE 720
RFW #: 9002L603, SEMIVOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of nine soil samples collected on 02-13,14-90.

The samples were extracted on 02-26-90 and analyzed according to criteria set forth in SW 846 Method 8270 for TCL Semivolatile target compounds on 03-07,08,09-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were detected in these samples.
2. One of sixty-six surrogate recoveries is outside the EPA QC limits. However, EPA QC surrogate recovery criteria are met [i.e., no more than one outlier per fraction (acid and base neutral) and no recoveries less than 10%].
3. The matrix spike and replicate requirement are fulfilled by sample GS720-01-02 (9002L604-001) also extracted in batch 90LE0272.



Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-16-90

Date

maj/wpmemo/02-603s.cn

DATA QUALIFIERS

- U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.
- J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero; for example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.
- E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I = Interference.
- A = Aldol Condensation Product.
- X = Additional qualifiers used as required are explained in the case narrative.
- NQ = Result qualitatively confirmed but not able to quantify.

ABBREVIATIONS

- BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD = Indicates blank spike duplicate.
- MS = Indicates matrix spike.
- MSD = Indicates matrix spike duplicate.
- DL = Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.
- NA = Not applicable.
- DF = Dilution factor.
- NR = Not required.

Cust ID: GS720 14-01 GS720 02-01 GS720 02-01A GS720 06-01 GS720 05-01 GS720 01-02

Sample Information	RFW#:	Matrix:	D.F.:	Units:
	002	SOIL	1.00	ug/Kg
	004	SOIL	1.00	ug/Kg
	006	SOIL	1.00	ug/Kg
	008	SOIL	1.00	ug/Kg
	009	SOIL	1.00	ug/Kg
	011	SOIL	1.00	ug/Kg

Surrogate Recovery	Nitrobenzene-d5 2-Fluorobiphenyl p-Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	56 68 80 69 62 64	% % % % % %	59 68 79 71 65 59	% % % % % %	46 53 63 52 45 39	% % % % % %	60 72 91 79 72 81	% % % % % %	65 79 94 79 64 54	% % % % % %	83 77 116 114 91 57	% % % % % %
Phenol		350	U	350	U	340	U	370	U	350	U	350	U
bis(2-Chloroethyl)ether		350	U	350	U	340	U	370	U	350	U	350	U
2-Chlorophenol		350	U	350	U	340	U	370	U	350	U	350	U
1,3-Dichlorobenzene		350	U	350	U	340	U	370	U	350	U	350	U
1,4-Dichlorobenzene		350	U	350	U	340	U	370	U	350	U	350	U
Benzyl alcohol		350	U	350	U	340	U	370	U	350	U	350	U
1,2-Dichlorobenzene		350	U	350	U	340	U	370	U	350	U	350	U
2-Methylphenol		350	U	350	U	340	U	370	U	350	U	350	U
bis(2-Chloroisopropyl)ether		350	U	350	U	340	U	370	U	350	U	350	U
4-Methylphenol		350	U	350	U	340	U	370	U	350	U	350	U
N-Nitroso-Di-n-propylamine		350	U	350	U	340	U	370	U	350	U	350	U
Hexachloroethane		350	U	350	U	340	U	370	U	350	U	350	U
Nitrobenzene		350	U	350	U	340	U	370	U	350	U	350	U
Isophorone		350	U	350	U	340	U	370	U	350	U	350	U
2-Nitrophenol		350	U	350	U	340	U	370	U	350	U	350	U
2,4-Dimethylphenol		350	U	350	U	340	U	370	U	350	U	350	U
Benzoic acid		1800	U	1700	U	1700	U	1800	U	1800	U	1800	U
bis(2-Chloroethoxy)methane		350	U	350	U	340	U	370	U	350	U	350	U
2,4-Dichlorophenol		350	U	350	U	340	U	370	U	350	U	350	U
1,2,4-Trichlorobenzene		350	U	350	U	340	U	370	U	350	U	350	U
Naphthalene		350	U	350	U	340	U	370	U	350	U	350	U
4-Chloroaniline		350	U	350	U	340	U	370	U	350	U	350	U
Hexachlorobutadiene		350	U	350	U	340	U	370	U	350	U	350	U
4-Chloro-3-methylphenol		350	U	350	U	340	U	370	U	350	U	350	U
2-Methylnaphthalene		350	U	350	U	340	U	370	U	350	U	350	U
Hexachlorocyclopentadiene		350	U	350	U	340	U	370	U	350	U	350	U

* Outside of EPA CLP GC limits.

REF#	002	004	006	008	009	011
2,4,6-Trichlorophenol	350 U	350 U	340 U	370 U	350 U	350 U
2,4,5-Trichlorophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
2-Chloronaphthalene	350 U	350 U	340 U	370 U	350 U	350 U
2-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Dimethylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
Acenaphthylene	350 U	350 U	340 U	370 U	350 U	350 U
2,6-Dinitrotoluene	350 U	350 U	340 U	370 U	350 U	350 U
3-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Acenaphthene	350 U	350 U	340 U	370 U	350 U	350 U
2,4-Dinitrophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
4-Nitrophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Dibenzofuran	350 U	350 U	340 U	370 U	350 U	350 U
2,4-Dinitrotoluene	350 U	350 U	340 U	370 U	350 U	350 U
Diethylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
4-Chlorophenyl-phenylether	350 U	350 U	340 U	370 U	350 U	350 U
Fluorene	350 U	350 U	340 U	370 U	350 U	350 U
4-Nitroaniline	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
4,6-Dinitro-2-methylphenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	350 U	350 U	340 U	370 U	350 U	350 U
4-Bromophenyl-phenylether	350 U	350 U	340 U	370 U	350 U	350 U
Hexachlorobenzene	350 U	350 U	340 U	370 U	350 U	350 U
Pentachlorophenol	1800 U	1700 U	1700 U	1800 U	1800 U	1800 U
Phenanthrene	350 U	350 U	340 U	370 U	350 U	350 U
Anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Di-n-Butylphthalate	350 U	41 J	340 U	370 U	350 U	40 J
Fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Butylbenzylphthalate	350 U	350 U	340 U	370 U	350 U	350 U
3,3'-Dichlorobenzidine	700 U	690 U	680 U	740 U	710 U	700 U
Benzo(a)anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Chrysene	350 U	350 U	340 U	370 U	350 U	350 U
bls(2-Ethylhexyl)phthalate	410	300 J	660	190 J	330 J	39 J
Di-n-Octyl phthalate	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(b)fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(k)fluoranthene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(a)pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Indeno(1,2,3-cd)pyrene	350 U	350 U	340 U	370 U	350 U	350 U
Dibenzo(a,h)anthracene	350 U	350 U	340 U	370 U	350 U	350 U
Benzo(g,h,i)perylene	350 U	350 U	340 U	370 U	350 U	350 U

(1) - Cannot be separated from Diphenylamine. ** Outside of EPA CLP GC limits.

Cust ID: GS720 08-01

GS720 07-01

GS720 01-01

SBLK

SBLK BS

Sample Information

RPM#:	012	013	014	90LE0272-MB1	90LE0272-MB1
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
D.P.:	1.00	1.00	1.00	1.11	1.11
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

Surrogate Recovery	Nitrobenzene-d5	70	%	48	%	75	%	68	%	68	%
	2-Fluorobiphenyl	66	%	47	%	69	%	76	%	75	%
	p-Terphenyl-d14	99	%	86	%	93	%	91	%	87	%
	Phenol-d5	93	%	64	%	99	%	71	%	78	%
	2-Fluorophenol	66	%	48	%	71	%	55	%	64	%
	2,4,6-Tribromophenol	44	%	43	%	43	%	42	%	59	%
Phenol		380	U	370	U	360	U	370	U	81	%
bis(2-Chloroethyl) ether		380	U	370	U	360	U	370	U	370	U
2-Chlorophenol		380	U	370	U	360	U	370	U	74	%
1,3-Dichlorobenzene		380	U	370	U	360	U	370	U	370	U
1,4-Dichlorobenzene		380	U	370	U	360	U	370	U	74	%
Benzyl alcohol		380	U	370	U	360	U	370	U	370	U
1,2-Dichlorobenzene		380	U	370	U	360	U	370	U	370	U
2-Methylphenol		380	U	370	U	360	U	370	U	370	U
bis(2-Chloroisopropyl) ether		380	U	370	U	360	U	370	U	370	U
4-Methylphenol		380	U	370	U	360	U	370	U	370	U
N-Nitroso-Di-n-propylamine		380	U	370	U	360	U	370	U	63	%
Hexachloroethane		380	U	370	U	360	U	370	U	370	U
Nitrobenzene		380	U	370	U	360	U	370	U	370	U
Isophorone		380	U	370	U	360	U	370	U	370	U
2-Nitrophenol		380	U	370	U	360	U	370	U	370	U
2,4-Dimethylphenol		380	U	370	U	360	U	370	U	370	U
Benzol acid		1900	U	1800	U	1800	U	1800	U	1800	U
bis(2-Chloroethoxy)methane		380	U	370	U	360	U	370	U	370	U
2,4-Dichlorophenol		380	U	370	U	360	U	370	U	370	U
1,2,4-Trichlorobenzene		380	U	370	U	360	U	370	U	88	%
Naphthalene		380	U	370	U	360	U	370	U	370	U
4-Chloroaniline		380	U	370	U	360	U	370	U	370	U
Hexachlorobutadiene		380	U	370	U	360	U	370	U	370	U
4-Chloro-3-methylphenol		380	U	370	U	360	U	370	U	76	%
2-Methylnaphthalene		380	U	370	U	360	U	370	U	370	U
Hexachlorocyclopentadiene		380	U	370	U	360	U	370	U	370	U
** Outside of EPA CLP GC limits.											

RFM#	012	013	014	90LE0272-MB1	90LE0272-MB1
2,4,6-Trichlorophenol	380 U	370 U	360 U	370 U	370 U
2,4,5-Trichlorophenol	1900 U	1800 U	1800 U	1800 U	1800 U
2-Chloronaphthalene	380 U	370 U	360 U	370 U	370 U
2-Nitroaniline	1900 U	1800 U	1800 U	1800 U	1800 U
Dimethylphthalate	380 U	370 U	360 U	370 U	370 U
Acenaphthylene	380 U	370 U	360 U	370 U	370 U
2,6-Dinitrotoluene	380 U	370 U	360 U	370 U	370 U
3-Nitroaniline	1900 U	1800 U	1800 U	1800 U	1800 U
Acenaphthene	380 U	370 U	360 U	370 U	94
2,4-Dinitrophenol	1900 U	1800 U	1800 U	1800 U	1800 U
4-Nitrophenol	1900 U	1800 U	1800 U	1800 U	106
Dibenzofuran	380 U	370 U	360 U	370 U	370 U
2,4-Dinitrotoluene	380 U	370 U	360 U	370 U	78
Diethylphthalate	380 U	370 U	360 U	370 U	370 U
4-Chlorophenyl-phenylether	380 U	370 U	360 U	370 U	370 U
Fluorene	380 U	370 U	360 U	370 U	370 U
4-Nitroaniline	1900 U	1800 U	1800 U	1800 U	1800 U
4,6-Dinitro-2-methylphenol	1900 U	1800 U	1800 U	1800 U	1800 U
N-Nitrosodiphenylamine (1)	380 U	370 U	360 U	370 U	370 U
4-Bromophenyl-phenylether	380 U	370 U	360 U	370 U	370 U
Hexachlorobenzene	380 U	370 U	360 U	370 U	370 U
Pentachlorophenol	1900 U	1800 U	1800 U	1800 U	95
Phenanthrene	380 U	370 U	360 U	370 U	370 U
Anthracene	380 U	370 U	360 U	370 U	370 U
Di-n-Butylphthalate	380 U	370 U	360 U	370 U	370 U
Fluoranthene	380 U	370 U	360 U	370 U	370 U
Pyrene	380 U	370 U	360 U	370 U	113
Butylbenzylphthalate	380 U	370 U	360 U	370 U	370 U
3,3'-Dichlorobenzidine	750 U	730 U	720 U	740 U	740 U
Benzo(a)anthracene	380 U	370 U	360 U	370 U	370 U
Chrysene	380 U	370 U	360 U	370 U	370 U
bis(2-Ethylhexyl)phthalate	55 J	67 J	360 U	370 U	370 U
Di-n-Octyl phthalate	380 U	370 U	360 U	370 U	370 U
Benzo(b)fluoranthene	380 U	370 U	360 U	370 U	370 U
Benzo(k)fluoranthene	380 U	370 U	360 U	370 U	370 U
Benzo(a)pyrene	380 U	370 U	360 U	370 U	370 U
Indeno(1,2,3-cd)pyrene	380 U	370 U	360 U	370 U	370 U
Dibenzo(a,h)anthracene	380 U	370 U	360 U	370 U	370 U
Benzo(g,h,i)perylene	380 U	370 U	360 U	370 U	370 U

(1) - Cannot be separated from Diphenylamine. * - Outside of EPA CLP GC limits.

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 14-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-002

Sample wt/vol: 30.9 (g/mL) G

Lab File ID: M030806

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.77	900	JAB
2.	ALDOL CONDENSATE	6.48	300	JAB
3.	UNKNOWN	19.18	300	J
4.	ADIPATE	22.25	100	JB
5.	HYDROCARBON	22.87	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 02-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-004

Sample wt/vol: 30.9 (g/mL) G

Lab File ID: M030807

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	300	JAB
3.	UNKNOWN	19.17	400	J
4.	ADIPATE	22.23	100	JB
5.	UNKNOWN	22.83	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 02-01A

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-006

Sample wt/vol: 31.0 (g/mL) G

Lab File ID: M030808

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 5 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	1000	JAB
2.	ALDOL CONDENSATE	6.52	500	JAB
3.	ALDOL CONDENSATE	7.55	400	JA
4.	UNKNOWN	19.17	300	J
5.	HYDROCARBON	22.85	100	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 06-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-008

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030809

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 11 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	500	JAB
3.	ALDOL CONDENSATE	7.55	500	JA
4.	UNKNOWN	19.18	600	J
5.	HYDROCARBON	22.87	300	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 05-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-009

Sample wt/vol: 30.6 (g/mL) G

Lab File ID: M030810

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/08/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	400	JAB
3.	UNKNOWN	19.18	500	J
4.	ADIPATE	22.25	200	JB
5.	HYDROCARBON	22.87	200	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01-02

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-011

Sample wt/vol: 30.8 (g/mL) G

Lab File ID: M030903

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 7 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.85	3000	JAB
2.	ALDOL CONDENSATE	6.55	600	JAB
3.	ALDOL CONDENSATE	7.57	400	JA
4.	UNKNOWN	19.18	500	J
5.	HYDROCARBON	22.85	500	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

GS720 08-01

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-012

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030904

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 13 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

CONCENTRATION UNITS:

(ug/L or ug/Kg) ug/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.30	300	JA
2.	ALDOL CONDENSATE	5.80	3000	JAB
3.	ALDOL CONDENSATE	6.52	800	JAB
4.	ALDOL CONDENSATE	7.55	500	JA
5.	UNKNOWN	19.20	400	J

1F
SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 07-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-013

Sample wt/vol: 30.5 (g/mL) G

Lab File ID: M030905

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 11 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	2000	JAB
2.	ALDOL CONDENSATE	6.53	600	JAB
3.	ALDOL CONDENSATE	7.55	600	JA
4.	UNKNOWN	19.17	300	J
5.	HYDROCARBON	22.83	300	J

SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

GS720 01-01

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 9002L603-014

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: M030906

Level: (low/med) LOW

Date Received: 02/16/90

% Moisture: not dec. 8 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/09/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.82	3000	JAB
2.	ALDOL CONDENSATE	6.53	1000	JAB
3.	ALDOL CONDENSATE	7.57	100	JA
4.	UNKNOWN	19.18	1000	J
5.	HYDROCARBON	22.82	1000	J

SEMIVOLATILE ORGANICS ANALYSIS SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

Lab Name: Roy F. Weston, Inc. Work Order: 0630-28-13-0000

SBLK

Client: WSRC GUNSITE 720

Matrix: SOIL

Lab Sample ID: 90LE0272-MB1

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: M030713

Level: (low/med) LOW

Date Received: 02/26/90

% Moisture: not dec. 0 dec.

Date Extracted: 02/26/90

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 03/07/90

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.11

Number TICs found: 5

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	ALDOL CONDENSATE	5.78	1000	JA
2.	ALDOL CONDENSATE	6.52	1000	JA
3.	UNKNOWN	7.30	200	J
4.	UNKNOWN	9.02	200	J
5.	ADIPATE	22.22	200	J



ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720

SAMPLES RECEIVED: 02-16-90

RFW #: 9002L603

W.O. #: 0630-28-13

INORGANIC NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All preparation blanks were analyzed below the required detection limit.
2. All calibration verification checks were within the required control limits of 90-100%. Calibration verification is performed using independent standards.
3. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).

NOTE: For solid samples, all results are reported on a dry weight basis.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

3-21-90
Date

GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

- U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.
- * - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and, therefore, the control limits are not applicable.

ABBREVIATIONS

- MB - Method or preparation blank.
- MS - Matrix Spike.
- MSD - Matrix Spike Duplicate.
- REP - Sample Replicate.
- LC - Indicates a method LCS or Blank Spike.
- NC - Not calculable, result below the detection limit.

LABORATORY CHRONOLOGY AND HOLDTIME REPORT

The test code listed indicates the specific analysis or preparation procedure employed. The codes may be interpreted as follows:

- MAAW - Metals prep test for AA digestion, water matrix.
- MAAS - Metals prep test for AA digestion, soil matrix.
- MICW - Metals prep test for ICP digestion, water matrix.
- MICS - Metals prep test for ICP digestion, soil matrix.
- M**TO- This type of code indicates a total metal analysis (eg. MAGTO indicates an analysis for total silver).
- M**SO- This type of code indicates a soluble metal analysis. (eg. MAGSO indicates an analysis for soluble silver).
- M**EP- This type of code indicates an EPTOXICITY metals analysis (eg. MAGEP indicates an analysis for eptox silver).
- I**TO- This type of code indicates a non-metallic total analysis. There is also a complimentary soluble analysis for each of these codes (eg. ICNTO indicates an analysis for total cyanide).

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-002	GS720 14-01	% SOLIDS	92.2	%	0.10
		TOTAL ORGANIC CARBON	274	MG/KG	28.0
		PH	4.9	PH UNITS	0.10
-003	GS720 04-01	% SOLIDS	93.4	%	0.10
		TOTAL ORGANIC CARBON	2700	MG/KG	50.0
		PH	5.2	PH UNITS	0.10
-004	GS720 02-01	% SOLIDS	94.8	%	0.10
-005	GS720 03-01	% SOLIDS	94.7	%	0.10
-011	GS720 01-02	% SOLIDS	93.0	%	0.10
-014	GS720 01-01	% SOLIDS	89.9	%	0.10
		TOTAL ORGANIC CARBON	5180	MG/KG	104
		PH	5.0	PH UNITS	0.10

ROY F. WESTON INC.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-----	-----	-----	-----	-----	-----
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	20.0	u MG/KG	20.0
BLANK20	90LTZ001-MB2	TOTAL ORGANIC CARBON	20.0	u MG/KG	20.0

ROY F. WESTON INC.

INORGANICS ACCURACY REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002E603

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	410	20.0 u	400	102
		TOTAL ORGANIC CARBON	412	20.0 u	400	103
BLANK20	90LTZ001-MB2	TOTAL ORGANIC CARBON	395	20.0 u	400	98.8

002872

ROY F. WESTON INC.

INORGANICS DUPLICATE SPIKE REPORT 03/14/90

CLIENT: WSRC GUNSITE 720
WORK ORDER: 0630-28-13-0000

WESTON BATCH #: 9002L603

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	90LTZ001-MB1	TOTAL ORGANIC CARBON	102	103	0.50

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 14-01						
% SOLIDS	002	S	90L&S040	02/14/90	03/03/90	03/04/90
GROSS ALPHA	002	S		02/14/90		
GROSS BETA	002	S		02/14/90		
TOTAL ORGANIC CARBON	002	S	90LTZ001	02/14/90	03/01/90	03/01/90
PH	002	S	90LPH042	02/14/90	03/08/90	03/08/90
GS720 04-01						
% SOLIDS	003	S	90L&S040	02/14/90	03/03/90	03/04/90
TOTAL ORGANIC CARBON	003	S	90LTZ001	02/14/90	03/01/90	03/01/90
PH	003	S	90LPH042	02/14/90	03/08/90	03/08/90
GS720 02-01						
% SOLIDS	004	S	90L&S040	02/14/90	03/03/90	03/04/90
GS720 03-01						
% SOLIDS	005	S	90L&S040	02/14/90	03/03/90	03/04/90
GROSS ALPHA	005	S		02/14/90		
GROSS BETA	005	S		02/14/90		
GS720 01-02						
% SOLIDS	011	S	90L&S040	02/13/90	03/03/90	03/04/90
GS720 01-01						
% SOLIDS	014	S	90L&S040	02/13/90	03/03/90	03/04/90
GROSS ALPHA	014	S		02/13/90		
GROSS BETA	014	S		02/13/90		
TOTAL ORGANIC CARBON	014	S	90LTZ001	02/13/90	03/01/90	03/01/90
PH	014	S	90LPH042	02/13/90	03/08/90	03/08/90

LAB QC:

TOTAL ORGANIC CARBON	MB1	S	90LTZ001	N/A	03/01/90	03/01/90
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Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L603

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	MB1 BS	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB1 BSD	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB2	S	90LTZ001	N/A	03/01/90	03/01/90
TOTAL ORGANIC CARBON	MB2 BS	S	90LTZ001	N/A	03/01/90	03/01/90



208 WELSH POOL ROAD
PICKERING CREEK INDUSTRIAL PARK
LIONVILLE, PA 19353
PHONE: (215) 524-7360
TELEX: 83-5348

14 May 1990

Mr. Howard Hickey
Westinghouse Savannah River Company
Building 740-3A
Aiken, SC 29808

Re: Analytical results for samples collected at Gunsite 720 (RFW
batches 9002L603 and 604)

Dear Mr. Hickey:

Enclosed are the analytical results for WSRC release order 13,
Gunsite 720. These results consist of an electronic data
deliverable, and a standard commercial report which includes a case
narrative summarizing QA/QC results.

If we can provide any further information, please feel free to
contact myself or Ben Shapiro.

Very truly yours,

ROY F. WESTON, INC.

Jack R. Tuschall
Laboratory Manager
Analytics Division

JRT/clk

Enclosure:

cc: Michelle Wilson
David Oliphant
Ben Shapiro

WESTON ANALYTICS
LIONVILLE, PA
DATA TRANSFER RECORD

SHEET 1 OF 1
DISK 1 OF 1

LIMS ☒
WALIS ☒
INITIAL ☒
CORRECTED ☐
OTHER ☐

CLIENT: WSRC GUNSITE 720

PROJECT MANAGER: BEN SHAPIRO

ELECTRONIC ☒
HARD COPY ☐

ANALYSIS	RFW #	FILE NAME	SITE	W.O. #
METALS VOA BNA INORGANICS PHC RAD	9002L603	W9002603.DAT	GUNSITE 720	0630-28-13
VOA PEST/PCB BNA HERBICIDES TDF OP PEST INORGANICS METALS	9002L604	W9002604.DAT	GUNSITE 720	0630-28-13

ELECTRONIC TRANSFER BY: *[Signature]*

DATE OF TRANSFER: 5/10/90

HARD COPY TRANSFER BY: _____

DATE OF TRANSFER: _____

RECEIVED BY: _____

DATE OF TRANSFER: _____

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WSRC GUNSITE 720

DATE RECEIVED: 02/16/90

RFW LOT # :9002L604

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
GS720 01 02	001	S	90LVW028	02/13/90	N/A	02/24/90

LAB QC:

VBK	MB1	S	90LVW028	N/A	N/A	02/24/90
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ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WSRC GUNSITE 720
RFW #: 9002L604, GC/MS VOLATILE
W.O. #: 0630-28-13

SAMPLES RECEIVED: 02-16-90

NARRATIVE

The set of samples consisted of one soil sample collected on 02-13-90.

The sample was analyzed according to criteria set forth in SW 846 Method 8240 for Appendix IX Volatile target compounds on 02-24-90.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analysis:

1. Non-target compounds were not detected in this sample.
2. All surrogate recoveries are within EPA QC limits.
3. The blank contains Methylene chloride and Acetone at levels less than 5x the CRQL.

Jack R. Tuschall
Jack R. Tuschall, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

4-4-90
Date

RFW Batch Number: 9002L604

Roy F. Weston, Inc. - Lionville Laboratory
Volatiles by GC/MS, Appendix IX List
Client: MSRC GUNSITE 720

Report Date: 03/27/90 13:48
Work Order: 0630-28-13-0000
Page: 1a

Cust ID: GS720 01 02 VBLK

Sample Information

RFW#: 001 90LWM028-MB1
Matrix: SOIL
D.F.: 0.986 SOIL
Units: ug/kg 1.00 ug/kg

Surrogate	Toluene-d8	102	99
Recovery	Bromofluorobenzene	100	101
	1,2-Dichloroethane-d4	114	96
Chloromethane		11 U	10 U
Bromomethane		11 U	10 U
Vinyl Chloride		11 U	10 U
Chloroethane		11 U	10 U
Methylene Chloride		10 B	8
Acetone		26 B	13
Carbon Disulfide		5 U	5 U
1,1-Dichloroethene		5 U	5 U
1,1-Dichloroethane		5 U	5 U
1,2-Dichloroethene (total)		5 U	5 U
Chloroform		5 U	5 U
1,2-Dichloroethane		5 U	5 U
2-Butanone		11 U	10 U
1,1,1-Trichloroethane		5 U	5 U
Carbon Tetrachloride		5 U	5 U
Vinyl Acetate		11 U	10 U
Bromodichloromethane		5 U	5 U
1,2-Dichloropropane		5 U	5 U
cis-1,3-Dichloropropane		5 U	5 U
Trichloroethene		5 U	5 U
Dibromochloromethane		5 U	5 U
1,1,2-Trichloroethane		5 U	5 U
Benzene		5 U	5 U
Trans-1,3-Dichloropropene		5 U	5 U
Bromoform		5 U	5 U
4-Methyl-2-pentanone		11 U	3 J
2-Hexanone		11 U	5 J
Tetrachloroethane		5 U	5 U
1,1,2,2-Tetrachloroethane		5 U	5 U

* Outside of EPA CLP GC limits.

RFW Jtch Number: 90021604

Client: MSRC GUNST.

Work Order: 0630-28-13-0000

Cust ID: GS720 01 02

VBLK

RFW#:

001

90LVM028-MB1

Toluene	5	U	5	U
Chlorobenzene	5	U	5	U
Ethylbenzene	5	U	5	U
Styrene	5	U	5	U
Xylene (total)	5	U	5	U
Acrolein	11	U	10	U
Acrylonitrile	11	U	10	U
Trichlorofluoromethane	2	J	5	U
Dichlorodifluoromethane	11	U	10	U
Acetonitrile	21	U	20	U
Iodomethane	11	U	10	U
Propionitrile (Ethyl Cyanide)	54	U	50	U
3-Chloropropene	21	U	20	U
Methacrylonitrile	21	U	20	U
Dibromomethane	11	U	10	U
Isobutyl alcohol	21	U	20	U
1,2-Dibromomethane	21	U	20	U
1,1,1,2-Tetrachloroethane	11	U	10	U
1,2,3-Trichloropropane	11	U	10	U
trans-1,4-Dichloro-2-butene	54	U	50	U
1,2-Dibromo-3-chloropropane	21	U	20	U
2-Chloro-1,3-Butadiene	110	U	100	U

** Outside of EPA CLP GC limits.

APPENDIX C

RISK ASSESSMENT METHODS

Based upon the available evidence, there are no chemicals of potential concern. Because of this there are no chemicals remaining for evaluation by a CERCLA baseline risk assessment. Therefore, there is no determinable risk associated with Gunsite 720 Rubble Pit Unit.